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Tax competition and the move from insurance to assistance

Michaël ZEMMOUR[1]

Abstract: The funding of social protection has strongly evolved in Bismarckian countries: whereas social protection used to rely on social contributions, since the 1990s most of the new expenditures have been funded through taxation, leading to a more balanced mix in the structure of social protection revenue. I propose a formal model in which two social protection systems may coexist: insurance funded through social contributions and assistance funded through taxation. Insurance level is set by consensus between firms and unions, whereas assistance expenditures are set by a majority vote in parliament. Social insurance can be manipulated to influence preferences in respect of assistance. It is shown how an exogenous increase in tax competition in a Bismarckian context can lead to the emergence of a mixed model: assistance increases to complement existing insurance, not to replace it. A time series cross-section analysis on 9 countries over 25 years supports the idea that a drop in corporate tax rates can trigger a shift in the tax structure of social protection funding.

Résumé : Le financement de la protection sociale a fortement évolué dans les pays bismarckiens: alors que ces pays privilégient historiquement le financement par cotisation sociale, on constate que les nouvelles dépenses survenues depuis les années 1990 ont été financées essentiellement par le budget de l'Etat. L'article propose un modèle formel dans lequel deux systèmes de protection sociale coexistent: l'assurance, financée par cotisation et l'assistance, financée par l'impôt. Le niveau d'assurance est négocié par les partenaires sociaux tandis que le niveau de l'assistance est entre les mains du parlement. Les partenaires sociaux peuvent manipuler le niveau de l'assurance pour influencer la demande politique concernant l'assistance. Les résultats montrent comment dans un contexte bismarckien, une augmentation exogène de la concurrence fiscale peut expliquer le développement d'un régime mixte assistance/assurance. Une analyse économétrique sur un panel de 9 pays et sur 25 années établit une synchronie entre concurrence fiscale et évolution de la structure du financement de la protection sociale.

Keywords: assistance, institutional change, insurance, political economy, tax-competition, veto.

Mots-clés: changement institutionnel, cotisations sociales, finances publiques, économétrie comparative, microéconomie de la protection sociale, taxation.

JEL: P16, H5, H2

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1. Introduction

In this paper, I argue that the development of tax-funded assistance and the relative decline of insurance in Bismarckian countries can be traced back to the intensification of tax competition. The development of Bismarckian social insurance was the historical outcome of a corporatist compromise in response to political demand for social protection. Business had an incentive to compromise because of the threat of statist intervention: social insurance was a means of preventing the implementation of a universal scheme associated with a high level of taxation of profits. The increase in tax competition associated with financial openness changed the political equilibrium by offering most profitable firms a better exit option.

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The consequences of globalisation on welfare states in general and social protection in particular remain ambiguous: whereas the intensification of international trade and tax competition should theoretically have triggered a *race to the bottom* (Pestieau [2006], Avi Yonah [2000]), the increase in social risk due to globalisation has increased political demand for social protection.[2] Empirically, no evidence has so far emerged of a *race to the bottom* in social protection spending (Pestieau [2006]). As far as corporatist countries in Europe are concerned, the expansion of public social protection expenditure has been the rule at the aggregate level:[3] the share of GDP dedicated to social protection expenditure tended to grow in most continental and Mediterranean European countries between 1980 and 2008, whereas other countries of Western Europe (i.e. the Nordic and liberal countries) experienced sharp retrenchment episodes.[4]

Nonetheless, social protection has undergone important structural changes in Bismarckian countries since the beginning of the 1990s. One of the most important is the deformation of the social protection funding structure in those countries: whereas social protection was typically funded through social contributions (earmarked payroll taxes) in Bismarckian schemes, the share of budgetary expenditure in social protection funding has increased in all countries of continental Europe since the beginning of 1990s, with the exception of the Netherlands (Palier and Martin [2007], Eurostat [2008], Zemmour [2011]). On the

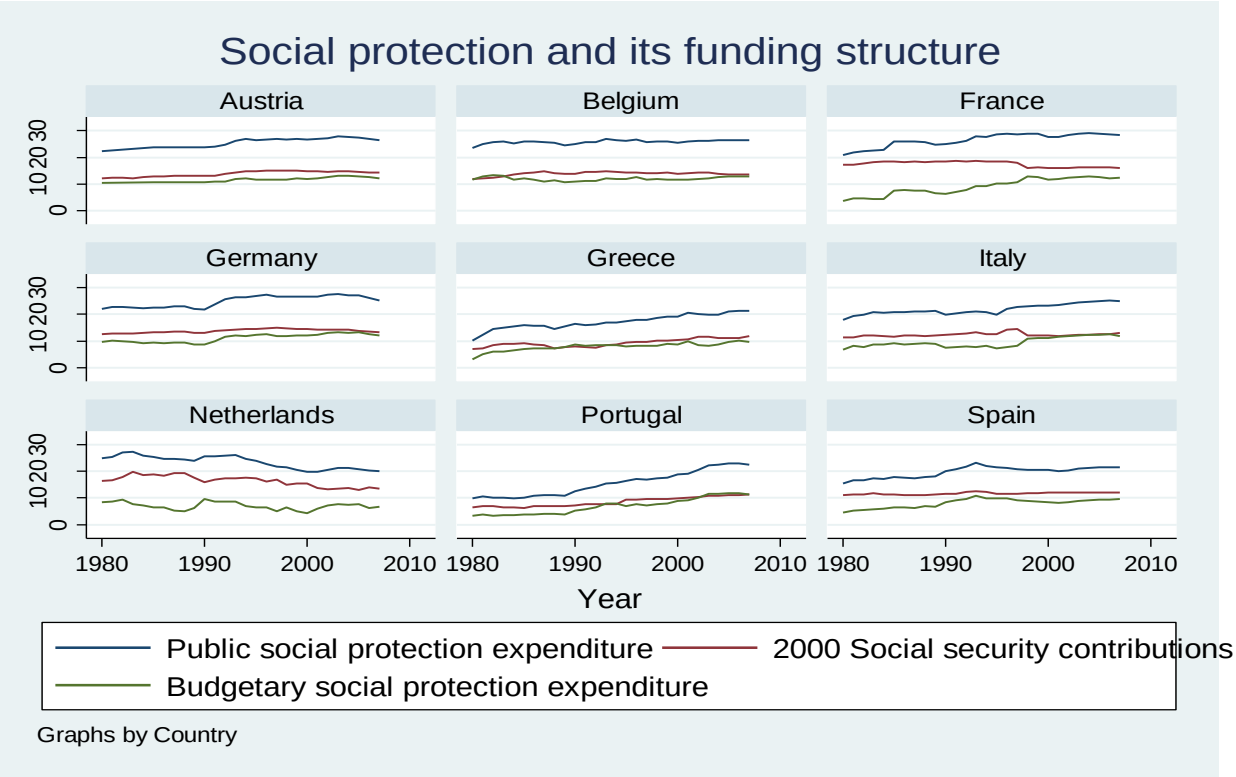
[2] A review of the argument can be found in Genschel (2004) or Boix (2011).

[3] The picture may be more contrasted at the micro level.

[4] This stylised fact is not attributable to the differential in the growth rate: the same result is obtained when using potential GDP as opposed to real GDP.

expenditure side, this change is associated with a relative decline in insurance schemes (contributory benefits) as compared with assistance mechanisms (non-contributory schemes, delivering universal or targeted flat or means-tested benefits). A careful analysis of the aggregate data shows something unexpected: the relative decline of social contributions in social protection funding is not due to cuts in social contributions. In general, the aggregate level of social security contributions, after a phase of rapid increase, has remained steady since the 1990s. The change is that new expenditure has been funded through other tax revenue. Thus, in spite of a few episodes where the revenue derived from some social security contributions has been shifted to alternative taxation (France and Italy in 1997-1998, Germany in 2007), the change in the funding structure is attributable far more to an increase of tax-funded expenditure than to a substitution of social contribution by other taxes (see Figure 1).

Figure II- 1: Social protection and its funding structure (in GDP points)



Source: OECD, points of GDP.

The puzzle addressed by this paper is thus the following: how is it that Bismarckian countries have become less and less Bismarckian as far as their tax system is concerned? Why are they

shifting towards a mixed model as it is observed? Why has this change occurred at different times in each country?

An extensive literature on social protection funding gives arguments in favour of abandoning social security contributions with respect to trade competitiveness, labour cost, unemployment, etc. I will review them in the literature section. But due to their normative perspective, they are more convincing in explaining why reform *should* happen, rather than why it *did* or *did not* and *the form it took*: as shown by Saint-Paul (2000) in the case of labour-market reforms, even suboptimal policy can be very resilient if some groups are in a position to prevent any reform of the status quo.

Amable and Palombarini (2009) argue that the causal determinant of institutional change is the dynamics of the socio-political coalitions that support institutions. The defeat of one coalition by another, a change in the economic interests of one or several of its members, or a change in the balance of power within the coalition can trigger institutional change. In this perspective, this paper intends to explore the material determinant of social protection institutions by paying attention to the interests of socioeconomic groups and the modality of the political mediation between them.

I propose a framework in which two possible social schemes coexist: insurance and assistance. For a stylised representation, both systems differ in their funding structure (contributions vs taxation) and their benefit calculations (earnings-related vs flat-rate benefits), but not in their scope or coverage.[5] Insurance is governed by corporatist bargaining between firm representatives and unions, whereas assistance depends on fiscal policy, i.e. on parliament and its constituency – namely taxpayers. Using a formal model, I show how these dimensions can interact: social insurance can be manipulated to influence preferences on assistance. I analyse the conditions under which a Bismarckian compromise emerges in favour of the development of social insurance. It is shown how an exogenous increase in tax competition[6] in a Bismarckian context can lead to the emergence of a mixed model: assistance

[5] I am aware that this is generally not the case: insurance coverage is generally limited to workers, whereas assistance is not necessarily universal and may be targeted on the poorest. Yet I have assumed that coverage is the same so as to focus on the taxation and benefit-calculation aspect. Moreover, it has often been argued that the change in social protection funding can be explained by the universalisation of social protection (see literature section). I show in the model that this is not necessarily true: it is quite possible that unions prefer social insurance to social assistance, even if insurance is very broad-based and includes a redistributive portion.

[6] The intuition that tax competition is liable to undermine the stability of an existing political arrangement comes from Amable and Gatti (2004) on another topic. The model presented in section 4 is also inspired by this work.

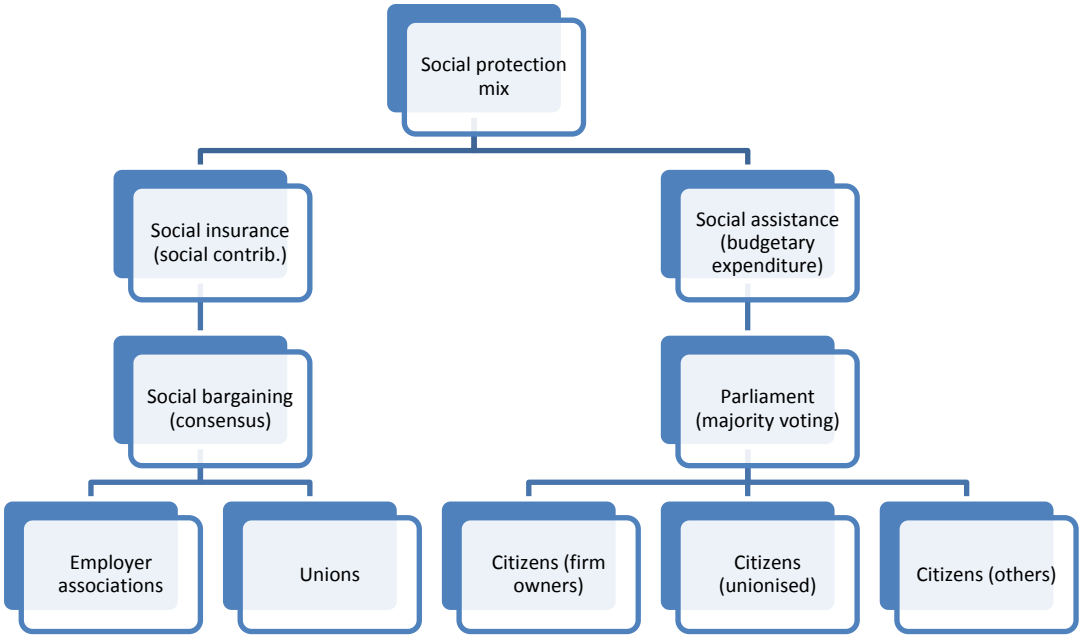
increases to complement existing insurance, not to replace it, just as it has been observed in Bismarckian countries. A time series cross-section analysis on nine countries over 25 years supports the idea that a drop in the corporate tax rate can trigger a shift in the tax structure of social protection funding.

1.1. The argument

In corporatist countries, the power of raising taxes and budgetary expenditure is not identical to the power of raising or lowering social contributions (elaboration on this point can be found in Bonoli an Palier [1996, 2000], Palier [2005] and Koreh and Shalev [2009]). In a nutshell, budgetary expenditure (and taxation) depends solely on the government and on a decision by parliament, but changing the contribution rate depends on an agreement being reached between unions and employer associations. If no consensus is reached to change the contribution rate, the former rate applies[7] (Figure 2).

[7] This is clearly a very stylised picture: the role of the government may be much more important and the role of social partners may vary across countries and social schemes. Nonetheless, the fact that social insurance is a matter of social bargaining whereas social assistance is in the hands of the state (or an infra-state entity) is an established fact.

Figure II- 2: A model of decision making in social protection



It is assumed that the decision taken in social bargaining (on the left hand side) precedes the parliamentary decision (on the right).

Thus, there is no unified governance of social protection as a coherent system.[8] On the contrary, the level of social contributions and the level of public social protection expenditure stem from two separate decisions, made in interaction, by different actors under specific rules. This can easily be understood if one has in mind, for instance, the interaction between unemployment insurance (governed by unions and employers) and minimal income (French RSA, German Harz IV, etc.), which is dependent on the government. One of the contributions of this dissertation is seriously to consider this institutional distinction as a means of comprehending trends in social protection.

Consequently, the decline of corporatist social protection should be analysed as the product of two mechanisms (Figure 1 and 2): i) the freeze of the contribution rate and ii) the existence of a parliamentary majority in favour of raising budgetary expenditure dedicated to social protection.

Based on this analysis, I propose an argument explaining the political sclerosis of the corporatist part of social protection over the last 20 years.

[8] Except if a general consensus among all stakeholders is built, as may have been the case in the Netherlands.

In the advanced democracies, there is broad demand for a public social protection scheme to shelter against social risk. By default (i.e. in the absence of any other scheme), this demand will be addressed by the state through the implementation of assistance (if there is a majority to implement such a system). But social partners have at their disposal the means to avoid state intervention by setting up an alternative system:[9, 10] social insurance. Indeed, if social insurance is important enough (in terms of generosity and coverage), it can reduce political demand for a statist schemes to a negligible level. Firms will support corporatist social protection when the expected cost of the social contributions borne by employers is lower than the taxation expected to fund assistance. This support accordingly depends on the effective ability of the state to tax profits: if this ability is low (because of capital mobility and intense tax competition), firms will prefer an increase in assistance to an increase in insurance because assistance-related taxation will cause little damage to their profits.[11] Labour unions support corporatist social protection as long as they consider assistance as too redistributive towards the poor (and possibly less generous for workers).[12]

At the constitutional stage, if the context makes firms and unions supportive of social insurance, a Bismarckian outcome will emerge: social insurance crowds out assistance. Should one or the other parties be opposed to it, a statist assistance scheme will prevail. But this can also happen in a context where Bismarckian insurance already exists: if at a given time, one of the social partners prefers statist social protection to social insurance, it will become impossible for the other one to obtain an increase in social insurance. Conversely, the social partner supportive of assistance will be unable to obtain a substantive cut in social insurance without a consensus. If such a situation were to arise in a Bismarckian framework, social insurance would be frozen at its previous level and variation in demand for social protection would be addressed by assistance. This is my reading of Figure 1: after decades of dynamism, social insurance is almost frozen at its historic level. At least one of the social partners (unions I argue) still prefers social insurance: were this not to be the case, there would have been a massive transfer from insurance to assistance.

[9] This is historically documented, at least for Germany at the end of the 19th century, and for France after WW2.

[10] On the emergence of corporatism in general (not in the single dimension of social protection), Jo Martin and Swank (2012) make the same argument concerning the Danish case.

[11] In a recent note, Askenazy (2012) endorses a similar view on the link between social contributions and profit taxation: "Today, we cannot rule out seeing a reduction in labour costs through reduced employer contributions translating simply into (...) [a] transfer of surplus profits generated in countries with lower corporate tax and growth in dividends (…)".

[12] This assumption is in line with the results obtained by Conde-Ruiz and Profeta (2007), except that they do not include the specific role of firms.

The increase in budget-funded social protection can be seen as government's response to political demand for more social protection (especially because of ageing) in a context where corporatist social protection is frozen.[13] This response is probably supported by labour: even though unions prefer corporatist social protection to universal assistance, they will clearly prefer social assistance to nothing as a means of addressing new needs.

To return to the puzzle of the globalisation-social protection nexus, the hypothesis tested here is that the increase in tax competition did not primarily affect the level of social protection, but rather the way in which social demand is politically addressed.

The remainder of the paper is organised as follows: in section 2, I propose a review of the literature. In section 3, I present a model formalizing the argument. Section 4 display empirical evidence and section 5 concludes.

2. Literature

In this section I summarise the main reasons that could have led to change in the funding structure of social protection in corporatist countries, according to the literature (2.1). I explain why I see tax competition as a major channel of transmission of the globalisation effect (2.2). I then review empirical evidence on tax competition in Europe (2.3) and present recent analysis on the tax competition-social protection nexus (2.4).

2.1. Theories on the decline of Bismarckian system: the trade side of "globalisation theory"

I argue that tax competition induced a decline in social security contributions in social protection funding. But many other explanations have been provided as to why the Bismarckian style of social protection funding has been abandoned (and why it is better to do so). I briefly review here the main explanations found in the literature. They are generally related to labour-cost issues and "globalisation theory", from its trade-openness perspective rather than in its financial-openness version.

- Social contributions generate unemployment

[13] The item "budgetary expenditure" includes the public deficit, but a closer look at the national accounts shows that deficit spending has not been used to boost social protection expenditure: tax-funded social protection has been paid either by higher taxation or by cuts in other public expenditure (Appendix 7.5).

Social contributions are seen as distortive, at least when funding non-contributory benefits. Basically, the share of social contributions that is not perceived as income by workers creates a wedge between the net wage and the labour cost, thereby preventing adjustment in the labour market between labour supply and labour demand (Cahuc and Zylberberg [2001]).

Moreover, when unemployment is high, this model requires that social contributions be increased in order to maintain the benefit level, which in turn tends to generate unemployment. Consequently, the corporatist model of social protection funding, designed in a time of full employment, is seen as particularly vulnerable and self-weakening in a time of growing unemployment. Esping-Andersen (1996) depicts this situation by the phrase "welfare states without work". One view (currently expressed in the academic literature and in the public debate) is that the Bismarckian model has become economically and politically unsustainable, stuck in a negative spiral.

This logic can be reinforced by the globalisation of trade: not only do social contributions create a wedge between the net wage and labour cost, they also prevent firms from adjusting their labour cost in response to their competitors from non-corporatist countries, making them less competitive. This is why a shift in social contributions to VAT could favour competitiveness and employment (Gauthier [2009], Le Cacheux [2012]).

- Social contributions cannot fund universal benefits

This argument is related to the preceding one, but refers more to a distributional conflict than to the employment effect. Social contributions are a way to deal with the risk of wage loss by creating mandatory public social insurance that maintains a proportion of people's incomes. This design was the cornerstone of the Bismarckian model of social protection, but is not suited to change in a world in which most social protection schemes (especially health insurance) have tended to become universal. In this context, the corporatist funding of social protection tends to make employees pay for the social protection of all citizens, including children, students, the unemployed, etc. In an extreme case, in a system where corporatist funding supports a universal benefit scheme, it is possible that a person living on capital gains may pay no social contributions (he/she perceives no wages), but does receive benefits. An alternative tax base, not focused solely on labour, would therefore be a more appropriate means of funding such universal benefit schemes. This view is advocated by some scholars (Sterdyniak and Villa [1998]), and has also been endorsed by certain unions (Palier [2005]).

- The exhaustion of the corporatist system

The previous two arguments are fairly normative: scholars suggest that corporatist social protection can be economically suboptimal. But it can also have positive political implications: if citizens fear unemployment, firms concerned by the employment rate could, for instance, back cuts in social contributions. In fact, political economists have argued that the inefficiency of corporatist social protection has led to its political exhaustion:

> " [We describe the implementation] and the progressive exhaustion of the first type of (…) labour-shedding strategy as well as increases in social contribution rates. These (…) policies were partly exhausted by their endogenous disequilibrium asking ever fewer people in work to be ever more productive, and to pay for ever more social expenditure. The more deeply this strategy was implemented, the fewer human and fiscal resources there were to sustain it (...)" (Palier [2010], p. 367).

- The consequence of globalisation: labour cost has become a critical issue

The increasing openness of markets for goods, labour and capital has changed the balance of power between economic and political actors in favour of the most mobile ones. For instance, the global integration of certain markets (e.g. textile) first put constraints on wage bargaining, then fostered the development of the relevant sectors in countries where the unit labour cost was the lowest, to the detriment of others.

In view of this consideration, the inefficiency of corporatist funding of social protection (for the reasons stated above) would have become a critical issue, because globalisation has facilitated a more efficient allocation of capital and labour. In a time of globalisation, social contributions are not only inefficient but also increase the risk of prompting firms to relocate.

Genschel (2004) underlines that a stream of literature sees globalisation as revelatory of the economic inefficiency of the corporatist arrangement. For Palier ed. (2010), this mechanism is conveyed by the European Union:

> (...) there was an exogenous element that pushed actors to reassess their strategy and that provided arguments (if not real constraints) for a first reorientation. In most of the cases, this exogenous element came from the implementation of the single market and the preparation of the European single currency. This new context was crucial for revealing the failure of the initially adopted strategy" (ibid.).

- Corporatism as a component of the industrial era

An alternative view associates the decline of the Bismarckian system not to globalisation but to technological change: corporatism was born in the industrial sector and had a function in coordinated capitalism. Social protection works as an incentive to get specific skills required by industry (Iversen and Soskice [2001]), and helps insure against skill depreciation. Moreover, corporatist social protection was historically bargained between employers' associations and unions in the industrial sector, before being progressively extended to others. Progressive deindustrialisation has gradually undermined the social compromise that previously underpinned Bismarckian social protection, forcing labour to look for a new means of funding social protection (see Palier and Thelen [2010]). Simultaneously the deindustrialisation strengthens the political demand for social protection (Iversen and Cusack [2000]). In a way, this is a sophisticated version of globalisation theory, since deindustrialisation is attributable partly to the relocation of labour-intensive manufacturing in a context of globalisation.

2.2. What is the main causal mechanism linking globalisation and the welfare state: trade openness or tax competition?

This paper clearly adopts the globalisation theory perspective: while high unemployment, ageing and other factors are long-term trends that started at the beginning of the 1980s (i.e. before the decline of the Bismarckian model), globalisation, defined as trade and financial deregulation, has constituted a major shock over a short period of time, able to modify economic and political equilibriums and make more costly suboptimal arrangements on the labour market like corporatist social protection. But, as noted by Genschel (2004), globalisation theory includes at least two causal mechanisms: trade openness and tax competition. My claim is that the abovementioned literature on continental welfare states tends to overestimate the role of trade openness and to underestimate the role of tax competition (although both effects can potentially be combined).

Indeed, what globalisation does is to make factors more mobile, thereby putting pressure on governments to cut taxes: if tax pressure is too high, capital, labour and/or profits can be relocated to increase firms' profitability. Yet if this mechanism holds, the most sensitive channel should relate to the most mobile tax base: this is why, for instance even in a globalised context, household taxation is seen as far more effective than capital taxation.

To that extent, profit (and more precisely the high level generated by multinational firms) is clearly the most mobile tax base: while there are several economic reasons for capital or labour not to be relocated (in sectors not exposed to trade, because costs are not recoverable or because of a favourable institutional and economic context), there is almost no reason for profits not to be shifted to a tax haven since such a move is possible without relocating the production process. For this reason, I argue that tax competition should have at least as dramatic an effect on business strategy as an increase in trade openness, and I intend to explore the nexus between tax competition and social protection funding.

2.3. Tax competition on corporate taxation: a brief review

An extensive literature has dealt with tax competition on corporate profit taxation in the European Union. The main mechanisms and outcomes are sketched out in this section, but a recent and more comprehensive review of the literature on this topic can be found in Genschel and Schwarz (2011).

In a nutshell, there are at least two channels through which tax competition can lead to a decline in the corporate tax rate: investment location and profit shifting. Since the European Union is a free-trade zone, and since transport costs are relatively low, access to any of the EU's domestic markets is not constrained by a firm's location. In this context, a firm's location can respond to incentives such as low corporate taxation. Thus, a decision by one state (say Ireland) to cut its corporate tax rate puts pressure on other EU states to follow suit. Yet this channel is not necessarily the main one, since capital location also responds to other determinants (institutional environment, labour force, labour cost, etc.), and since it only applies for new investments: once capital has been located in a country, the cost of relocating it is considerable.

The second channel, associated with financial openness, is profit shifting: through transfer-pricing manipulation, decisions on patent location, headquarter location, or inter-firm business within the same multinational group, multinational firms have many means at their disposal to locate profits in the country offering the lowest level of taxation (Hines [1999]). Unlike locating a firm, profit shifting is an inexpensive exercise (it has no impact on the production process) and can even concern profits generated by investments made in the past. Theoretical elaboration of this argument can be found in Krautheim and Schmidt-Eisenlohr (2011), while a recent empirical estimate of profit shifting in Europe can be found in Huizinga and Laeven (2008) and Karkinsky and Rieden (2012) on patent location.

These mechanisms, trade openness and financial openness, compounded by a non-cooperative attitude between countries (Hugounenq et al. [1999], Le Cacheux [2002], Simmons [2006]), triggered a tax-competition process in the late 1990s and the 2000s: i) investment and/or profits tend to be attracted by low-tax countries; and, in response, ii) states tended to cut their corporate tax rate, thereby reducing the tax gap between countries.

Recent evidence has been gathered and published on diverse aspects of this process. First, consistent evidence has underlined the link between cuts in statutory (and effective) corporate tax rates and the tax-competition process. (Slemrod [2004], Simmons [2006], Cassette and Patty [2008]). Overesch and Rincke (2011) estimate that up to 10 points of reductions in the corporate tax rate in the western European Union should be ascribed to intra-zone tax competition. Osterloh and Debus (2012) add that the effect of tax competition on corporate taxation can be mitigated (but only slightly) when left-wing governments are in office.[14] In a similar perspective, Plümper et al. (2009) show that even if tax-competition affects countries, norms of fairness prevent some countries from cutting taxation on profits too deeply; this points to the emergence of a separate equilibrium rather than convergence towards a zero tax rate.

In theory, a tax-competition mechanism can concern any kind of taxation, but one may assume that the intensity of tax competition will be strongest for the most mobile tax base, such as capital income in general and firms' profits in particular (especially those of the most profitable ones). Thus, the effect of tax competition will not necessarily be to reduce the average tax burden on the economy, but to shift it from the most mobile tax base (capital income) to the least mobile ones (labour, consumption). This change, analysed and anticipated in Hugounenq et al. (1999) and Pestieau (2006, pp. 50-59), is backed up by recent evidence of a decrease in the ex-ante ratio of tax on capital to that on labour (Schwarz [2007], Devereux et al. [2002]).

Thus, based on this literature and evidence, I take it as given that tax competition has reduced the ability of European states to raise revenue by raising corporate taxation: this does not mean simply that tax rates have decreased, it also implies that the fact that they have decreased under constraint is a clear signal that it will not be possible to raise them back. For

[14] The analysis by Dupont et al. (2000) of the tax reform implemented between 2001 and 2003 by the French Socialist government is a good example of a left-wing government marginally cutting corporate taxation (table 2, p.188) but reluctant about adopting an aggressive tax-competition strategy because of its consequences in term of progressivity (p. 185).

instance, Le Cacheux (2006) argues that, in spite of past cuts in corporate taxation, the enlargement of the European Union in 2004 and the non-cooperative attitude of smaller countries have kept France under pressure to implement further tax reform. From now on, increases in corporate taxation will not be an option for governments wishing to raise tax revenue in order to increase social expenditure.

Yet this evidence relies on the ex-ante tax ratio (statutory or effective average tax rate computed at the micro level, in view of the legal framework, interest rates, etc.), also called "forward-looking" in the literature. However, the same authors (Slemrod [2004], Simmons [2003], Schwarz [2007]) mention that there is no evidence of the effect of tax competition when using "backward-looking" indicators computed using effective tax revenue and aggregate profit indicators. For instance, in the period 1970-1993, Swank (1998) finds that the financial openness is in fact associated with higher corporate and social security tax revenue.

This does not mean that tax competition has no effect, but rather that there is no immediate linear relationship between the statutory corporate tax rate and corporate tax revenue. An extensive review of this point can be found in Clausing (2007). Among the reasons cited, there is the fact that cuts in the statutory rate have been accompanied by a broadening of the definition of taxable profit (Collins and Shackelford [1996], Lee and McKenzie [1989], Ruding [1992], all three cited by Simmons [2003]). Second, profit is all that is taxed, and less profitable firms can be exempted from corporate taxation; thus, the most profitable firms are likely to be attracted to low tax countries, while less profitable ones may stay in high-tax countries. A related argument is made by Swank (1998), who argues that capital mobility and tax competition have increased market efficiency and have in turn increased investment and tax revenue. Although this view appears optimistic today, it can account for individual cases such as Ireland, where a statutory tax rate among the lowest raised significant tax revenue by attracting multinationals' profits. Third, the prevailing dual-taxation system allows some taxpayers to decide whether their capital income will be taxed as corporate profit or as personal income.[15] As such, cuts in the corporate tax rate can make high taxpayers declare more profit and less personal income, artificially raising revenue labelled as "corporate-tax revenue".

[15] Due to this mechanism, corporate taxation plays the role of backstop in personal income taxation (Ganghof and Genschel [2008]), partly explaining the degressive nature of personal income tax for highest income decile (Landais et al. [2011]).

In this paper, I will use a forward-looking tax ratio, i.e. indicators closer to the statutory tax rate than effective tax revenue. There are two reasons for this: first, as stated above, forward-looking indicators are a much better proxy for capturing tax-competition phenomena than aggregate revenue. Second, the statutory rate is a political variable, one that can be immediately identified as a political decision: a change in the statutory tax rate is a political decision made by the government, whereas a change in aggregate tax revenue may have non-political origins.

2.4. Tax competition and change in the welfare state

Concerns about the effect of tax competition on the welfare state have long been raised. According to Genschel (2004), this is one side of "globalisation theory",[16] the other side being trade openness. For instance, Rodrik (1997) and Avi-Yonah (2000) underline the fact that excessive tax competition has put welfare states at risk by preventing national states from extracting sufficient revenue to fund benefits. Since no welfare states have in fact collapsed, some authors have argued that tax competition was only a minor determinant of welfare state expenditure (Hines [2006]). A third view proposes a diluted version of the effect of tax competition on social protection: it did not reduce public revenue, but constrained the ability to tax profits and pressured governments to increase/maintain the tax burden on labour (Genschel [2002]). This view is consistent with change in the capital-labour taxation ratio mentioned above.

The recent work of Plümper and Troeger (2012) endorses this view and makes the argument that tax competition has led governments to rely more on the taxation of labour (especially social security contributions) and deficit spending to fund welfare expenditure. Interestingly, they make a strong argument that the consequences of tax competition on welfare states depend on whether benefits are funded through social security contributions or through the tax system. They conclude their study by asserting that:

> "While [Continental welfare states] could maintain a high level of social security transfers, the liberal economies had to cut down on tax-based redistribution and to increase social security transfers. Not all governments in liberal market economies were able or willing to do so. Accordingly, income inequality increased most in liberal economies whose governments did not or very little increase social security transfers: the US and the UK."

[16] According to which, globalisation would make a generous welfare state unsustainable.

Although convincing as far as liberal countries are concerned (they have been less resilient to tax competition than continental ones), this narrative is inconsistent with one major stylised fact: the share of social security contributions in social protection funding has decreased in continental welfare states, whereas the share funded through taxation (and not solely by deficit spending) has increased in those countries (see Figure 3 below). The purpose of this paper is precisely to fill in the missing part of this story: I argue that tax competition applies pressure to shift the tax burden on to the less mobile tax base, but that the burden *has not been* shifted on to social security contributions due to their political and institutional characteristics. On the contrary, other forms of taxation on less mobile tax bases (personal income tax, consumption, etc.) have been preferred.

3. The economic model[17]

3.1. Foreword

The purpose of the model presented here is to exhibit the distributive mechanism implied by the coexistence of social insurance and assistance, how these consequences can be affected by tax competition and how several political equilibriums arise, explaining the different national choices between insurance and assistance. The model is inspired by Casamatta et al. (2000) for social schemes and by Person and Tabellini (2000) for its political features. As in many articles focusing on social insurance systems (Casamatta et al. [2000], De Donder and Hindriks [1998], Conde-Ruiz and Galasso [2005]), I ignore the effect of taxation on the labour-market equilibrium[18] to focus on the distributive consequences of taxation and social policy. An innovation of the model in comparison with political economy literature is to endogenise both the deadweight loss implied by labour taxation and the way this cost is shared between agents. In particular the deadweight loss will not be the same for all workers and for insurance and assistance schemes.

3.2. Basic framework

The economy includes three kinds of agents: firms (F), skilled workers (SK) and unskilled workers (U). For what follows, I assume that the agents of each group adopt a homogeneous political attitude. Moreover I assume that no group can alone obtain a majority of votes. So, as

[17] The reader not interested in algebra can jump to subsection 3.9, which presents the results of the model.

[18] I deliberately omit this effect here, assuming that the distributive effect of taxation strongly dominates the possible consequences on (un)employment. A more accurate picture could be obtained in further work by combining both effects.

in Person Tabellini (2000), I model the whole population as if it were comprised of three representative agents, one of each kind.

The production is organised as follows:

-SK, who earns a wage w_{sk} when at work.

-U, who earns a wage w_u when at work. It is assumed that $w_W > w_u$.

-For each worker i at work, F makes a constant pre-tax profit π_i.

Each worker i faces an exogenous probability φ_i of wage loss (unemployment, sickness, etc.).

It is assumed that $\varphi_{sk} < \varphi_u$. For simplicity, I normalise φ_u at 1, thereby assuming that unskilled's utility strictly increases with the generosity of social benefits.[19]

Two social schemes coexist: social insurance and universal assistance.

3.3. Social insurance

Social contributions are levied on wages at a rate c[20]. Worker i gets an earnings-related benefit $\alpha * c * w_i$ when the social risk is realised, where α is a structural parameter of the scheme.

The saturation of budgetary constraint yields:

$$\alpha = \frac{(1 - \varphi_{sk})w_{sk}}{\varphi_{sk} * w_{sk} + w_u}$$

3.4. Universal assistance

Labour is taxed at a rate t and profit at a rate $\mu * t$, where μ accounts for the ability of the state to tax profit as opposed to labour.[21] In what follows, I interpret μ as the intensity of tax competition.

[19] Put another way, it corresponds to the idea that their taxable income is so low and their risk exposure so high that the utility of the expected benefit always exceeds the disutility of taxation. This assumption seems highly reasonable for labour-market outsiders but also for low-wage workers.

[20] It is assumed here than even unskilled workers are eligible for social insurance. This is to make the least restrictive assumption possible with respect to my results, but one can obtain the very same result by assuming that unskilled workers are not entitled to social insurance.

[21] Formally, μ is the profit-labour tax ratio. It can be affected either by profit shifting (a share of profit realised is practically excluded from the tax base), or by the implementation of an official dual taxation favourable to profit.

For simplicity and without loss of generality, taxation is re-expressed *as if* wages were the only tax base. So t' is the tax rate, such as:

$$t' \equiv \frac{t * (\pi * \mu + w_{sk})}{w_{sk}}$$

All workers get the same benefit $D * t'$ when the risk is realised, where D is a structural parameter of the scheme.

The saturation of budgetary constraint yields:

$$D = \frac{(1 - \varphi_{sk}) w_{sk}}{\varphi_{sk} + 1}$$

3.5. The utility function of agents

The utility functions of firms and workers are as follows:[22]

Firm:

$$U_{firm} = \sum_i (1 - \varphi_i)[\pi_i - \left((1 - \gamma_i)c + (1 - \theta_i)t'\right) * w_i]$$

Workers:

$$U_i = (1 - \varphi_i) * \text{Log}[w_i * (1 - \gamma_i * c - \theta_i * t')] + \varphi_i * \text{Log}[\alpha * w_i * c + D * t']$$

Where γ_i and θ_i are the cost of social contributions and taxation supported by worker i. The complementary share $1 - \gamma_i$ and $1 - \theta_i$ are borne by the firm.

3.6. Fiscal incidence of taxation and social contribution

Based on the literature on taxation (Salanié [2011]), it is assumed that the cost sharing of labour taxation between firms and workers is as follows:

- the share of taxation perceived by workers as expectable benefits for him/herself (auto-insurance), is a pure substitute of the net wage and is thus entirely paid by workers (through a moderation of the net wage);

[22] These formal representations of utility functions and social insurance (earnings-related or uniform) are attributable to Casamatta et al. (2000). I do however introduce two modifications: i) the utility of agents is log-linear to simplify the algebra, and ii) while Casamatta et al. (2000) study the case of a single scheme more or less earnings-related, I present the case in which two schemes coexist and interact.

- the distortive share of taxation perceived (the *"deadweight loss"*, i.e. the portion that cannot be considered as auto-insurance) is shared between employers and employees within the wage-bargaining process, according to their respective bargaining power;
- Taxes levied on profits are paid solely by firms.[23]

The share γ_i of social insurance c paid by worker i is thus:[24]

$$\gamma_i = \frac{\varphi_i * \alpha * (1 - k_i)}{(1 - \varphi_i)} + k_i$$

where k_i is the relative bargaining power of the firm taking values between 0 and 1.[25]

The share θ_i of social assistance borne by worker i is:[26]

$$\theta_i(\mu) = \frac{\varphi_i * (1 - k_i)}{(\varphi_{sk} + 1)} + k_i * \frac{w_{sk}}{\pi * \mu + w_{sk}}$$

Clearly, the higher the tax competition (i.e. the lower the value of μ), the heavier the cost of assistance borne by workers.

3.7. The political system

Both schemes are associated with specific decision-making procedures:[27]

- Social insurance level c is bargained between SK and F against the status quo c_0. The outcome of the bargaining is denoted c_b.

$$c_b = \begin{cases} c_b(c_0) \neq c_0 \; if \; \dfrac{dU_F(c_0)}{dc} * \dfrac{dU_{SK}(c_0)}{dc} > 0 \\ c_0 \; else \end{cases}$$

  Meaning that c changes only if both social partners have a common interest in raising or lowering c in relation to its past value c_0.

[23] A slight share of profit taxation is however indirectly shifted back on to workers through the taxation of labour: higher taxation of profits induces higher benefit expectations for workers, thereby leading them to accept a higher share of taxation on labour.

[24] Proof in appendix 7.1.1 a/.

[25] k_i=1 is absolute power to the firm.

[26] Proof in appendix 7.1.1 b/ and c/.

[27] The coexistence of social bargaining and majority voting is used among others by Iversen and Soskice (2009) and Amable and Gatti (2004).

- Universal assistance is set at the preferred level of the median voter among the three agents (which is a representation of majority voting).

The timeline of the decision is the following:

T=0: Initial setting; agents observe exogenous parameters $c_0, t_0, \varphi_i, k_i, w_i, \mu$

T=0.1: Bargaining on c

T=0.2: Vote on t

T=1: Risk is realised, payoffs.

The model will be solved by backward induction.[28]

3.8. Solving the model

3.8.1. Vote on social assistance level t′ given the level of contribution c

First- and second-order conditions yield:

$$t'^{*}_{firm}(c) = 0$$

$$t'^{*}_{i}(c) = \begin{cases} \frac{\varphi_i}{\theta}(1 - c * \gamma_i) - (1 - \varphi_i) * \alpha * c \; for \; c \leq \bar{c} \\ 0 \; else \end{cases}$$

Where $\bar{c}$ is the solution of $t'^{*}_{i}(\bar{c}) = 0$.

It can easily be shown that SK is the median voter on t', so that the political outcome of the vote on social assistance, given c, is:

$$t'^{*} = t'^{*}_{sk}(c)$$

[28] The result of the model is obviously not independent of the order in which decisions are made. However, there is no structure-induced equilibrium: if decisions on *c* and on *t* are taken repeatedly, convergence will not happen. But admitting that the decision sequence is not infinite but restricted to a pair of decisions (one on *c* and the other on *t*), the timeline we propose (bargaining on *c* before voting on *t*) would be chosen by the majority over the alternative possibility (voting on *t* before bargaining on *c*): if firms and unions have a common interest in changing the level of *c*, they will prefer to do so before the level of *t* is set. Thus, they will support an agenda putting bargaining first. On the other hand, if they are against modifying the level of *c*, the result will not depend on the decision-making order.

3.8.2. Bargaining on social insurance between F and SK

The bargaining on c takes place before the vote on t', so that everybody has preference over c taking into account the future level of $t'^{*}(c)$.

The value of t' can thus be replaced by $t'^{*}_{sk}(c)$ in each utility function.

$$U_{firm}(c) = \pi - \sum_{i} \left((1-\gamma_i)c + (1-\theta_i(\mu))t'^{*}_{sk}(c)\right) * (1-\varphi_i) * w_i$$

$$U_i = (1-\varphi_i) * \text{Log}\left[w_i * \left(1-\gamma_i * c - \theta_i(\mu) * t'^{*}_{sk}(c)\right)\right] + \varphi_i * \text{Log}[\alpha * w_i * c + D * t'^{*}_{sk}(c)]$$

Given this (computation in Appendix 7.1), one obtain this table of preferences of social partners in respect of the level of social contributions. In the following table, + means that the agent locally prefers[29] an increase in *c* to obtain a cut in *t*.

$\frac{dU}{dc}$	$0 < \theta(\mu) < \frac{D * \gamma_{sk}}{\alpha * w_{sk}}$	$\frac{D * \gamma_{sk}}{\alpha * w_{sk}} < \theta(\mu) < \overline{\theta_{firm}}$	$\overline{\theta_{firm}} < \theta(\mu)$
Firms	+	+	-
Unions	-	+	+
Outcome	Frozen	Bargaining on c possible	Frozen

Since θ is a strictly decreasing function of a state's ability to tax profit μ, it becomes clear how a strong increase (or a strong decrease) in μ precludes any bargaining on the level of social contributions, because firms' and unions' interests are no longer aligned.

In such cases, one can expect the level of social contributions to remain constant (because one of the actors wants this to be the outcome) and any adjustment to the level of risk or change in the wage distribution to be set by an adjustment on the assistance side, i.e. a change in $t(c)$ but not in *c*.

Let $c_b(c_0)$ be the outcome of the bargaining between unions and firms on c_0.

[29] Meaning for value of *c* belonging to [0; $\bar{c}$]. For value above $\bar{c}$ there is no longer a trade-off between assistance and insurance.

The political outcome of social protection is:[30]

	$0 < \theta(\mu) < \frac{D * \gamma_{sk}}{\alpha * w_{sk}}$	$\frac{D * \gamma_{sk}}{\alpha * w_{sk}} < \theta(\mu) < \overline{\theta_{firm}}$	$\overline{\theta_{firm}} < \theta(\mu)$
c	c_0	$c_b(c_0)$	c_0
t	$t^*_{median}(c_0)$	0	$t^*_{median}(c_0)$
	Post corporatist	Corporatist	Universalist

Thus, the type of equilibrium (corporatist or not) depends on $\theta(\mu)$.

3.9. Conclusion of the model

To summarise these result in words, given an initial mix in social protection (c_0, t_0), the political response to any change in risk level/wage distribution/profit level will depend on a state's ability to tax profit.

- When the state can tax profit at a relative high rate, unions have no incentive to increase social insurance: the burden of assistance will be borne chiefly by profits, and workers (a coalition of skilled and unskilled) will be able to reach a majority to implement it. In the latter case, firms will veto any cut in social insurance, because maintaining a certain level of social insurance prevents unions from demanding additional assistance.
- When capital mobility and/or tax competition strongly limits the ability of the state to tax profits, any increase in assistance will rely primarily on workers. In the latter case, firms will have no interest in negotiating an increase in social insurance; conversely, unions will oppose any cut in social insurance because substituting assistance for insurance will be costly for their constituency. However, if the level of existing social insurance is insufficient in respect of demand for social protection, unions will back an increase in assistance (as a feasible second best).
- The corporatist compromise to manage demand for social protection by increasing/decreasing social insurance only happens when both unions and firms prefer social insurance to tax-funded assistance. Regardless of other determinants included in the model (risk level, risk distribution, wage distribution, profit-wage ratio, bargaining power of social partners), this is only possible when the ability to tax profits is high enough (so that firms have an incentive to make a deal with the unions),

[30] Here again it is assumed that c_0 belongs to [0; $\bar{c}$].

but not excessively high (so that the unions cannot expect social protection to rely solely on the taxation of profits).

Moreover, the model predicts that, all things being equal, a significant decrease in the state's ability to tax profits is likely to break the compromise in a formerly Bismarckian country: social insurance will be frozen (but will not collapse), and any new social protection expenditure will be funded through a tax-based assistance scheme. This is the general trend observed in Bismarckian countries over recent years.

The model also highlights an interesting dimension of social protection: the distinction between the preference for one scheme and the demand for a certain level of social protection. All agents have preferences for a certain type of arrangement to deal with social risk (social insurance or social assistance). But the preference for one scheme over the other and does not determine the absolute level of social insurance preferred by the agent. This offers an original explanation for the apparent paradox current in political economy:

-Firms absolutely prefer zero social protection but may support social insurance as opposed to social assistance, even if social insurance is more generous at the aggregate level.

-Skilled workers may absolutely prefer social insurance as opposed to social assistance (because of its less redistributive design), but simultaneously support an increase in social assistance (because an increase in social insurance is not achievable).

3.10. Discussion on the level of generality

The model displayed here presents the case of a trade-off between earnings-related insurance and flat-rate-benefit models. It can thus be applied to several kinds of social risk, such as unemployment, old age or sick leave. It has a relatively high level of generality, since non-contributors (unskilled in the model) are also entitled to insurance benefits, and as such it allows social insurance to operate cross-class redistribution. So, whereas it is generally admitted that universal coverage is a reason for unions to switch from social contributions to taxation, the model shows that this is not necessarily the case. Obviously, relaxing this assumption reinforces the bias of both firms and skilled workers in favour of insurance.

The model does not however correspond to the representation of health insurance or other flat-rate-benefit schemes (e.g. family). For those schemes, the sole distinction between insurance and assistance will not be in the definition of benefits (earnings-related vs flat-rate benefit) but in coverage. In this case, the same mechanism as displayed above may only apply if I relax the assumption that insurance and assistance have the same coverage. Conversely, once it is accepted that health insurance provides universal coverage, the model gives no reason for unions to support funding through social contributions alone.

4. Empirics

I test the hypothesis that competition in respect of corporate taxation is a determinant of the funding structure of social protection.

This hypothesis is first tested by using the growth rate of social security contributions as a dependent variable (DV). I then take the structure of social protection funding as DV (the share of social contribution in total social protection expenditure, called the "Bismarckian index"). In both cases, the model is first tested alone, then in competition with other theoretical explanations, by the progressive inclusion of corresponding controls.

4.1. Data

I use data provided by the OECD, except for the explanatory variable, which is provided by the Institute for Fiscal Studies (Devereux et al. [2002]). The sample includes nine countries (Belgium, Austria, France, Germany,[31] Greece, Italy, Netherlands, Spain and Portugal), between 1980 and 2005. An average of 20 observations are made by country, the minimum

[31] West Germany before 1991.

being 10 and the maximum being 25. The total sample includes 180 observations. I carried out regression control on the external validity of the argument by including non-Bismarckian countries (Denmark, Sweden, Finland, Ireland, Norway and the UK).

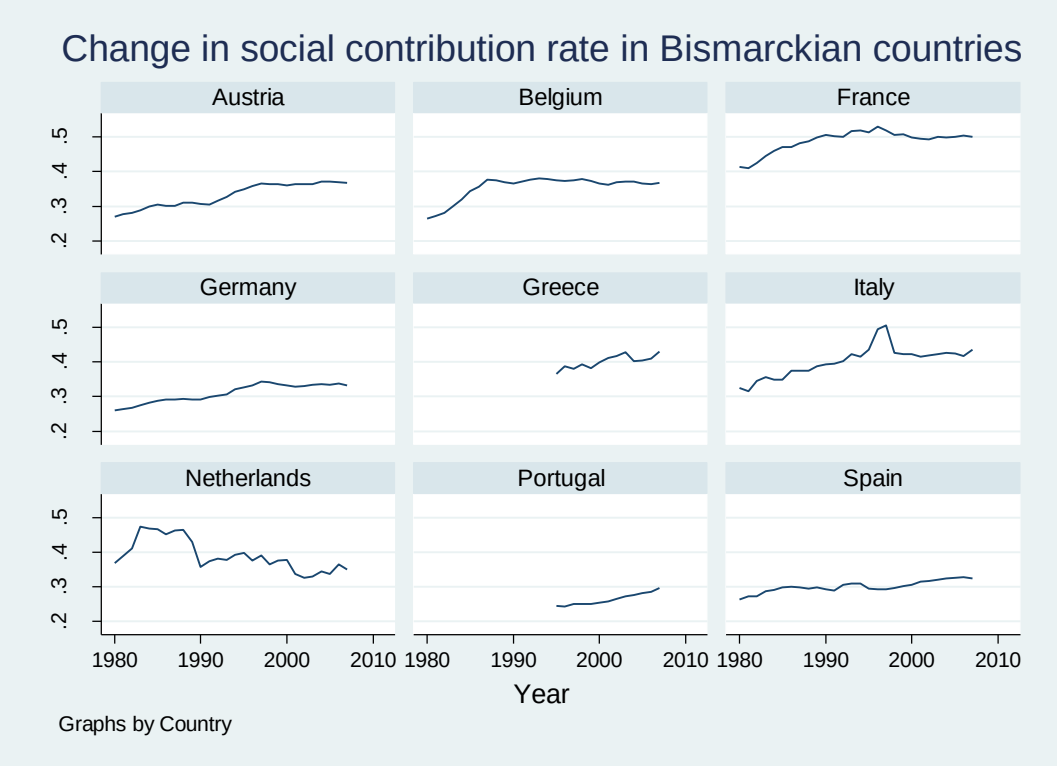
Dependent variables

Social contribution rate: defined as the total amount of social contributions (item 2000 in the OECD tax revenue statistics) divided by workers' remuneration ("Compensation of Employees" in national accounts provided by the OECD). Because of the chosen model, this variable is expressed in first differences. In an alternative specification, I use the moving average over three periods of the growth rate as DV.[32][33]

[32] This is because this variable is very volatile: even in periods when the contribution rate increases fast, the rate does not necessarily change every year. The moving average is a means of capturing the average increase in the contribution rate, over a period of time, without focusing on the calendar year. The drawback is that the introduction of a moving average reinforces the autocorrelation of variables and errors. Yet the result displayed above does not depend on the choice of the DV (yearly variable or moving average).

[33] See appendix 7.4 for long term evolution of social security contributions, since 1965.

Figure II- 3: Change in social contribution rate in Bismarckian countries (% of labour cost)



Rate of aggregate social contributions. Own calculation, OECD data. After a strong increase at the beginning of the period, the contribution rate appears to have reached a ceiling (Austria, Belgium, France[34], Germany, Spain, Greece).

The "Bismarckian index":[35] is defined as the share of social protection funded through social contributions. The index is straightforwardly computed as the ratio of total social security contributions paid (item 2000 in the OECD tax nomenclature) to total social public expenditure (OECD statistics). For France, this ratio includes an adjustment: to avoid a break due to a legal change, the portion of the CSG[36] levied on wages is considered here as a social contribution (which is not the case in the OECD data). The variable is ultimately standardised in order to reduce the co-linearity with the interacted variable.

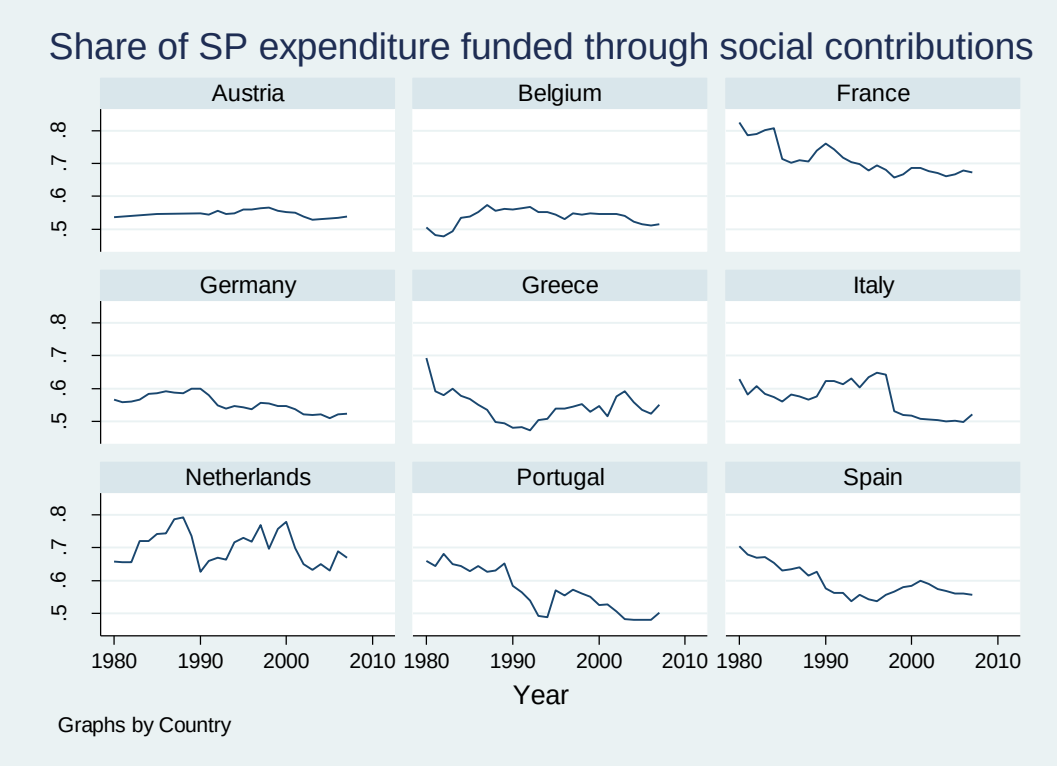
Bismcoun: dummy taking value 1 for countries where the non-standardised Bismarckian index is higher than 0.5 on average, i.e. the nine Bismarckian countries of the sample.

[34] The share of CSG levied on wages is included.

[35] This concept comes from Conde-Ruiz and Profeta (2007) where it has a slightly different sense: in their paper, the Bismarckian index accounts for the extent to which benefits are earnings-related.

[36] CSG: "*contribution sociale généralisée*", flat tax levied on labour income, pensions and capital income. Since the share levied on labour income is very similar to a social contribution and since it has replaced formerly existing social contributions, a share of CSG is considered as social contribution in the data.

Figure II- 4: Share of social protection expenditure funded through social contributions



Own calculation, OECD data. In almost all countries, there is a significant downward trend (not necessarily starting in 1980). For Austria the trend starts in 1999, observations on Greece are not sufficient to reach a conclusion. The Netherlands is clearly an outlier.

Explanatory variable:

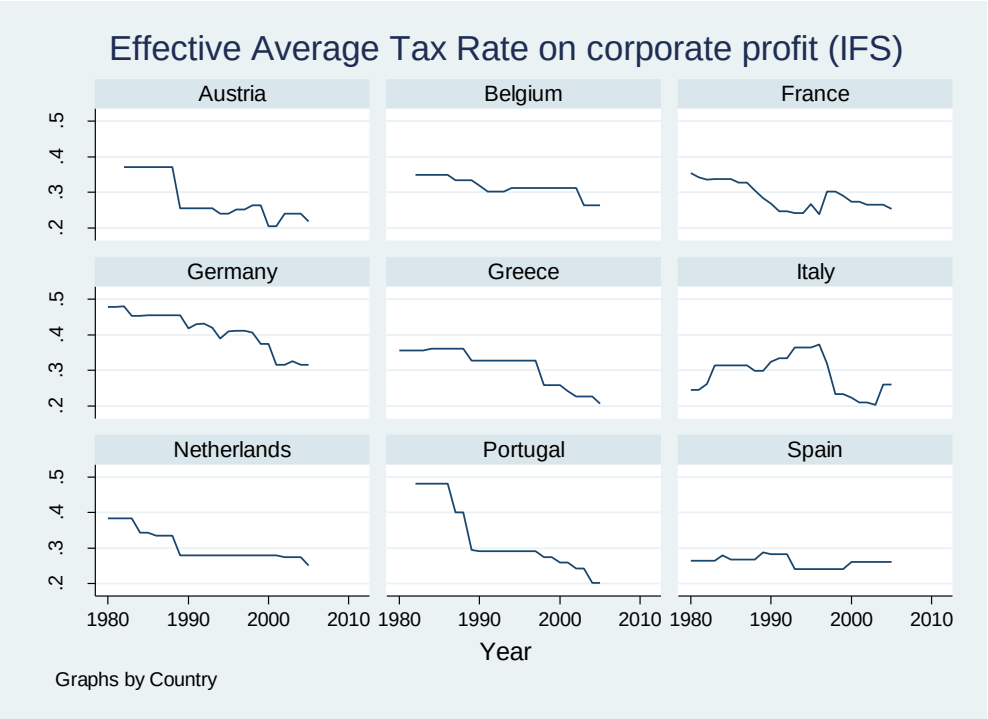
EATRIFS is the effective average tax rate computed by the Institute for fiscal studies between 1980 and 2005. This is a "forward-looking" rate[37] computed for manufacturing industry, taking into account the statutory corporate tax rate and the interest rate (for more details see Devereux et al. [2002]). This variable (close to the statutory corporate tax rate) is very sensitive to tax competition (Overesch and Rincke [2011], Genschel and Schwarz [2011]). The choice of a forward-looking tax rate seems the most appropriate to test the argument. First, because the statutory tax rate is much more sensitive to tax competition than the implicit tax rate computed ex-post, for an obvious reason: in a tax competition context, the country with the lowest corporate tax rate can attract profitable firms and obtain a high level of corporate tax revenue. Second, because the (constrained) decline in the EATR tax rate is a good proxy for the ability of the state to increase taxes on corporate profits: indeed, if a

[37] i.e. computed ex-ante at a micro level.

country is forced to lower the corporate tax rate due to tax competition, the threat of a tax increase on profits disappears, even if social protection increases. In view of the argument presented above, firms lose their incentive to support social contributions (because such an increase would primarily be borne by labour).

eatrbismcoun is the interacted variable between ***EATRIFS*** and the dummy ***bismcoun***

Figure II- 5: Effective Average Tax Rate (EATR) on corporate profit



The decrease of the effective average tax rate of corporate profit in manufacturing sector. Source: Institute for Fiscal Studies.

Controls

I control for two types of variables: i) an alternative variable related to globalisation (the trade side of it) that could also help explain change in the funding structure of social protection; and ii) domestic economic and demographic indicators that could also explain a change in the social protection funding structure, and the party in power.

Extra**:** the openness rate of manufactured goods. This variable is defined as the sum of imported and exported goods per year, in points of GDP. This is a proxy for another dimension of globalisation: the internationalisation of trade.

***Manulabcost*:** the unit labour cost in manufacturing. An excessively high labour cost in a sector exposed to international competition can be an incentive for the state to lower the burden on wages. A negative relationship between this variable and the DV is expected.

***Manufacturing*:** an OECD index of the share of the labour force working in the manufacturing sector. For several reasons, the importance of the manufacturing sector is associated with corporatism. The decline of manufacturing is a signal of the weakening of the corporatist arrangement, since employers of others sector may be less interested in supporting social contributions. The decline of manufacturing can also be a signal of the intensity of global competition, making pressure for cuts in non-wage labour costs in the tradable sector.

Kaopen: an index of *de jure* financial openness computed by Chinn and Ito (2008). This variable is expected to have a negative impact on the social contribution rate and the Bismarckian index. It is also supposedly correlated with EATR, but whereas EATR is a proxy for the effective consequences of tax competition at a country level, *kaopen* is a legal measurement of capital mobility.

Unemplrate: the unemployment rate provided by the OECD. An excessively high unemployment rate can be an incentive for certain actors to reduce labour taxation through social contributions.

***Senior*:** this variable accounts for the increase in social needs, be it for pensions or health expenditure. Together with unemployment, it also accounts for the share of inactive population.

***lrgovseats*:** is a new version[38] of an index of government ideology from Amable, et al. (2006). It controls for the political orientation of the party in power.

***Growth*:** growth rate of total public social expenditure.

***CPI*:** the inflation rate. A high level of inflation is seen as favouring corporatism.

***Idreu*:** a dummy variable that accounts for the inclusion of East Germany in the Federal Republic of Germany.

A last control is not included in main regressions because of a lack of observations (yearly observations unavailable): the share of health expenditure in total social protection

[38] Provided by Thibault Darcillon.

expenditure. Indeed it has been argued in the literature that tax-revenue was more appropriate than social contributions to fund universal health expenditure. Thus an increase in the share of health expenditure within total social protection expenditure could explain the decline of social contributions in social protection funding.[39] Regression displayed in appendix 7.2.3 (Table AII- 17) on available data (around 40 observations) show that results displayed below are robust to the inclusion of the share of health expenditure.

4.2. Method

The structure of our data suggests use of time series cross-section methodology in order to obtain sufficient variance and a sufficient number of observations. For the general methodology, I follow Beck and Katz (1995 and 2009), and I use panel-corrected standard errors in each regression.

I focus on the pattern of reform followed by each country (i.e. the variation "within" countries), as opposed to the absolute level of the dependent variable. This led me to choose a dynamic modelling of the DV. Following Beck and Katz (2009), and after running the appropriate tests, I chose a dynamic specification allowing for an autocorrelation at the first order. The first estimated equation is thus:

$$growth\ of\ contribution\ rate = \beta_1 EATR + \beta_2\ controls + fe + \varepsilon$$[40]

This specification uses the increase in the contribution rate as DV. In an alternative specification, this DV is smoothed over three periods. Because of the suspicion of non-stationarity of some independent variables, the same regression is tested with the DV re-expressed in second differences, while the explanatory variable is expressed in first differences.

The second specification, using the Bismarckian index as DV, is an LDV model (lagged dependent variable), for obvious statistical reasons: it is more than likely that the Bismarckian index of one country will be persistent over time (as opposed to the precedent DV, which is expressed in first differences). But there is also a theoretical reason for using an LDV model: political decisions on social protection funding systematically refer to the status quo ex-ante, especially concerning corporatist social protection. The explicit debate is never about setting

[39] Data on the evolution of social expenditure by risk are available in Appendix 7.6.

[40] The equation displayed here does not take into account the Prais-Winsten transformation used in the tested model.

social protection at a certain size, but always about raising or cutting it, more or less. The estimated relation is thus:

$$bismindx_t = \alpha\ bismindx_{t-1} + \beta_1 EATR + \beta_2\ controls + fe + \varepsilon$$[41]

In both specifications, the explanatory variable is expressed as a level: it is assumed that the level of the statutory corporate tax rate is a proxy for the intensity of tax competition. Thus, I do not expect a change in EATR to have only a transitory effect on corporatist social protection, but rather that the dynamism of corporatist social protection (the variation of the contribution rate, or the variation in the Bismarckian index) will depend on whether EATR is high or low.

Fixed effect and Prais-Winsten transformation (because of first-order autoregressive error) are included when tests show them to be required (i.e. in most cases).

Endogeneity issues are commonly raised in such econometrics; however, they do not appear to be a major concern here. First because the risk of reverse causality does not concern my main explanatory variable: the assumption that the corporate taxation is an exogenous factor (in the sense that it is not determined by the DV) is fairly reasonable and consistent with my theoretical framework. The risk of reverse causality is higher as far as some controls are concerned, especially labour cost and unemployment. Since I do not want specifically to interpret the coefficients of these controls, this issue is addressed simply by adding controls one by one, to be sure that the overall result does not come from the inclusion of one single variable associated with reverse causality. Ultimately, the sole real endogeneity issue is the assumption that corporate taxation level in each country is independent of the level of corporate taxation in other countries: we know from the literature mentioned above that the reduction of corporate taxation results from international tax competition. To take this into account among robustness checks, I instrumented the explanatory variable by its own lag and the lagged value of the average corporate tax rate (proxy of the intensity of tax competition).

[41] Idem.

4.3. Results

4.3.1. First regression: variation of the contribution rate as dependent variable

In this first model, the DV is the variation of the contribution rate. The inclusion of a fixed effect corresponds to a country-specific trend, attributable to exogenous factors (increase in social demand, ageing, catch-up effect, etc.).

In a first series of specifications, I test the interaction between my DV and the fact of the country being Bismarckian (Table 1). Whereas the coefficient of *EATR* is significant and negative when all countries are pooled together, the introduction of a regime dummy interacted with *EATR* stresses that the effect is only significant for the cluster of Bismarckian countries.

Table II- 1: Contribution rate and EATR in all countries and interacted with Bismarckian countries (PCSE)

	(1) dcontribra~g	(2) dcontribra~g	(3) dcontribra~g
EATR IFS	0.0528**	0.00299	0.103**
	(0.004)	(0.874)	(0.002)
bismcoun	-0.00672	-0.0252*	
	(0.091)	(0.011)	
eatrbismcoun		0.1000*	
		(0.012)	
Observations	294	294	193
R-squared	0.036	0.056	0.071

p-values in parentheses
* p<0.05, ** p<0.01, *** p<0.001

I then test the regression on the cluster of Bismarckian countries alone, including the one-by-one controls. All specifications include country dummies. Only the last specification includes year dummies. The auto-correlation coefficient of the error term is inferior to 0.25 for each specification.

Table II- 2: Variation of contribution rate and EATR in Bismarckian countries (PCSE)

	(1) dcontri~g	(2) dcontri~g	(3) dcontri~g	(4) dcontri~g	(5) dcontri~g	(6) dcontri~g	(7) dcontri~g	(8) dcontri~g	(9) dcontri~g	(10) dcontri~g
EATR IFS	0.113**	0.102**	0.137***	0.102**	0.117**	0.110*	0.110**	0.113**	0.150**	0.128**
	(0.001)	(0.006)	(0.000)	(0.005)	(0.001)	(0.025)	(0.003)	(0.004)	(0.003)	(0.005)
senior		-0.0506							0.0342	-0.0263
		(0.748)							(0.871)	(0.903)
Unemplrate		0.0297							0.0397	0.0463
		(0.554)							(0.427)	(0.493)
lrgovseats			0.000197*						0.000239**	0.000251**
			(0.038)						(0.008)	(0.006)
IPC				0.000537					0.00167	-0.000580
				(0.457)					(0.107)	(0.683)
salgrowth					-0.0256				-0.00641	0.0891
					(0.677)				(0.929)	(0.291)
manufacturing						0.00770			-.147	-0.151
						(0.940)			(0.225)	(0.492)
extra							-0.00420		-0.0125	0.00420
							(0.738)		(0.502)	(0.850)
kaopen								-0.0000174	0.0000583	-0.000895
								(0.994)	(0.981)	(0.767)
growth									-0.00457	0.0254
									(0.732)	(0.514)
Observations	193	193	182	193	193	193	193	193	182	182
R-squared	0.081	0.084	0.119	0.091	0.084	0.082	0.081	0.081	0.163	0.324

p-values in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Fixed effects are included. p values (computed through PCSE) are indicated under coefficient.

As expected, the explanatory variable *EATR* is positive and highly significant, meaning that more intense tax competition is correlated with slower (and possibly negative) growth in the contribution rate. According to the point estimate, the reduction of 10 points of corporate taxation would be associated with a reduction of 1 point per year in the increase in the contribution rate. The effect is thus consistent and significant.

The only significant control would appear to be the political orientation of the party in power, right-wing parties being associated with an increase in the contribution rate. However, the absolute value of the party effect is too negligible to suggest a causal interpretation (the most right-wing government possible would raise the contribution rate by 0.1 point of social contributions per year).

To conclude, neither of the controls related to an alternative explanation of social protection reform (*extra*, accounting for trade openness, and *manufacturing*, accounting for deindustrialisation) appears to be significant. Even in a specification from which my main explanatory variable (EATR IFS) is excluded, these variables remain insignificant.

4.3.2. Second regression: the Bismarckian index (the balance between contributions and other tax revenue) as DV

Table II- 3: Bismarckian index (standardized) and EATR (PCSE with LDV)

	(1) Standar~x	(2) Standar~x	(3) Standar~x	(4) Standar~x	(5) Standar~x	(6) Standar~x	(7) Standar~x	(8) Standar~x
lbismstd	0.747***	0.701***	0.705***	0.692***	0.686***	0.715***	0.697***	0.673***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EATR IFS	0.250	-0.290	0.875***	0.867**	1.095***	1.182***	1.299***	1.359***
	(0.169)	(0.161)	(0.001)	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)
bismcoun	0.345***	0.193**						
	(0.000)	(0.002)						
eatrbismcoun		1.303***						
		(0.000)						
Unemplrate			0.756					0.0180
			(0.099)					(0.968)
senior			-0.310					-0.488
			(0.664)					(0.665)
extra				-0.138				-0.0713
				(0.286)				(0.675)
manufacturing					0.593			-0.357
					(0.376)			(0.666)
manulabcost						0.136		-0.199
						(0.165)		(0.279)
lrgovseats							0.000526	0.000591
							(0.441)	(0.414)
Observations	329	329	213	200	201	213	187	174
R-squared	0.969	0.971	0.915	0.918	0.918	0.914	0.920	0.926

p-values in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Fixed effects are included. p values (computed through PCSE) are indicated under coefficient.

The DV used is the standardised Bismarckian index. The first column includes all the countries of the sample. The second tests the interaction effect between the Bismarckian regime and EATR. The last six columns are regressions on the subsample of Bismarckian countries alone.

The positive relationship between the Bismarckian index and EATR is only significant for the subsample of Bismarckian countries. None of the controls included appears to be significant.

4.4. Robustness checks

4.4.1. Difference in the contribution rate as DV

Since our controls do not modify the point estimate of the explanatory variable, and since the number of countries and observations is relatively low, certain robustness checks exclude controls to preserve a relatively high level of efficiency.

The first concern is the non-stationarity of variables: it requires us to test whether the significance of explanatory variables is not spurious. The fact that the results are robust to the inclusion of year dummies (last column, table 2) or a trend in the regression should reinforce

confidence in the estimated relation. Moreover, the re-estimate over a sub-period of time does not destabilise coefficients, which is a good sign (see Appendix 7.2.1 AII-2). Ultimately, the same model re-expressed in first differences (i.e. in second differences for the DV), confirms the significance of the explanatory variable[42] (Appendix 7.2.1 AII-4).

The inclusion of an auto-correlated structure of error (Prais-Winsten transformation) and the reasonable value of the rho coefficient of autocorrelation (below 0.25) provides a measure of confidence in the fact that the persistence of the DV does not drive the result.

The second concern is the inclusion of country fixed effect. Statistically, tests support their use (they effect coefficients), and there is a priori no problem in using fixed effect in a model without a lagged DV. From a theoretical point of view, the use of country fixed effect in a model with a DV expressed in first differences corresponds to the inclusion of a specific trend for each country; this inclusion could be useful in taking into account unobserved factors, such as catch-up effects in countries with low social protection or an idiosyncratic trend towards increasing social contributions every year. Yet this trend modifies the interpretation of the coefficient of the explanatory variable: the EATR effect corresponds to variations relative to the trend (see for instance Plümper et al. [2005]). The exclusion of this fixed effect (i.e. making the assumption that the default value of the DV is 0) modifies the point estimate (Table 4), but the sign and the significance of the explanatory variable remain unaffected.

Ultimately, the last concern comes from the assumption of homogeneous coefficients across countries: if the heterogeneity is too strong, the risk is that one single outlier can drive the result. This concern is addressed by using methodologies relaxing the assumption of a homogeneous coefficient. The first is from Pesaran and Smith (1995) and computes a weighted average coefficient country by country (see Appendix 7.2 Table AII-5). I do not see a theoretical reason why errors could be correlated across sections, however Pesaran's test of cross-section independence (Pesaran [2006]) is rejected, and the results are not robust to the inclusion of a cross-sectional random component. The second methodology is a maximum-likelihood estimation of coefficients including a fixed and a random (country-specific) component as advocated by Beck and Katz (2007). Both tests lead us to conclude that the coefficient of the explanatory variable is positive and significant.

[42] I nonetheless prefer to display the explanatory variable in level since, from a theoretical point of view, a model in first difference only accounts for short-term variations.

I also run cross-validation, by dropping countries one by one in the regression. It turns out that Italy is the biggest outlier, i.e. the country where the effect is the strongest. Ultimately, I run a simple PCSE regression allowing country-specific coefficients (Appendix 7.1.1 Table AII-8). Robustness tests lead to the conclusion that the explanatory variable EATR is significant at the 10% level, and that country-specific estimates support a positive relationship for all countries except Portugal. However, the effect of EATR is probably weaker than in the first estimate (roughly 0.06, as opposed to 0.11), with the main estimate driven by Italy. The results are fairly robust to the instrumentation of the DV (Table 4 and detailed results in Appendix 7.1.1 Table AII-9). The instrumentation seems appropriate according to usual tests (Appendix 7.1.1 Table AII-10). The only issue raised is that *manufacturing* and instrumented *EATR* are not jointly significant (last column of Table 4), probably due to co-linearity; however *EATR* alone has much better explanatory power than *manufacturing*.

Table II- 4: Recapitulative table of results - difference of contribution rate as DV

Dependent variable		d.contribution rate									
Estimation		OLS PCSE AR1 (FE)	OLS PCSE AR1 (FE)	OLS PCSE AR1 (FE)	OLS PCSE AR1 (FE)	OLS PCSE AR1 (FE)	OLS PCSE AR1	Mean group estimator, outlier robust	Random coefficient, Maximum likelihood estimator	IV-2SLS (Heteroscedastic)	IV-2SLS (Heteroscedastic)
Coefficient of EATR		0.113	0.08	0.15	0.06	0.128	0.117	0.086	0.053	0.089	0.079
p-value		0.001	0.001	0.003	0.071	0.005	0.011	0.059	0.006	0.004	0.214
Controls		No	No	Yes	Yes	Yes	Yes	No	No	No	Yes
Country fixed effect		Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Year dummy		No	No	No	No	Yes	No	No	No	No	No
idreu		Yes		Yes	Yes	Yes	Yes			Yes	Yes
Italy excluded		No	Yes	No	Yes	No	No			No	No
AR1		0.232	0.258	0.166	0.143	0.095	0.226	No	0.122	No	No
T		25	25	25	25	25	25	25	25	25	25
N		9	8	8	7	8	8	9	9	9	8
Obs		193	168	182	158	182	182	193	193	191	180
R2		0.081	0.055	0.163	0.172	0.324	0.11			0.095	0.17

4.4.2. The Bismarckian index as DV

The concerns here are the same as for the first regression (non-stationarity): autocorrelation of errors and homogeneity of coefficients across countries. One additional concern comes from the specifications of the model, namely that it includes an LDV and fixed effect, since Plümper et al. (2005) cast doubt on the joint use of LDV and fixed effect (in contradiction to what they call the "Beck and Katz standard"), going so far as to advocate the use of simple Prais-Winsten transformation in preference to the inclusion of an LDV. Moreover, the use of an LDV introduces a "Nickel Bias" in the coefficient (but makes the estimator more consistent). I therefore test the model, removing either the fixed effect or the LDV. The sign and significance of the explanatory variable is not importantly modified (see Appendix 7.2.2 Tables AII- 10 and AII- 11). However (this is not a surprise in view of the explanation contained in Plümper et al. [2005]), controls are more significant when the LDV is removed:

unemployment rate, the proportion of seniors in relation to the population and the manufacturing labour cost have significant and negative coefficients.

The results are robust to the inclusion of a year dummy, and to the inclusion of a random component in coefficients. A cross-validation shows that Italy is again a strong outlier: the results are not robust to the exclusion of Italy as long as it includes an LDV. Removing Italy reduces the value of the EATR coefficient, but it remains positive (see Appendix A11). Specifications allowing heterogeneity in coefficients (Mean Group Estimator from Pesaran and Smith (1995) and Random Coefficient Estimator) tend to confirm the sign and the estimate range of the explanatory variable. The results are also robust to the instrumentation of the DV (see Table 5).

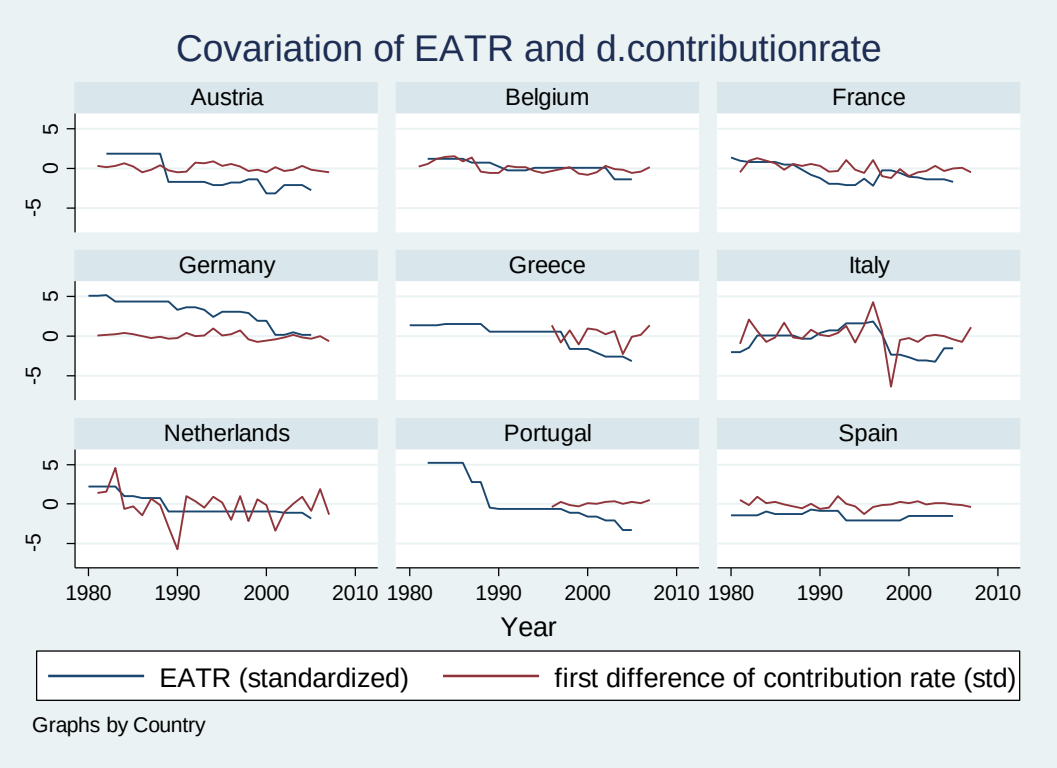
Table II- 5: Recapitulative table of results (Bismarckian index as DV)

Dependent variable		Standardized Bismarckian index										
Estimation		OLS PCSE LDV (FE)	OLS PCSE LDV (FE)	OLS PCSE LDV (FE)	OLS PCSE LDV (FE)	OLS PCSE LDV	OLS PCSE AR1 (FE)	OLS PCSE AR1 (FE)	Mean group estimator, outlier robust coeff	Random coefficient, Maximum likelihood estimator	IV-2SLS (Hetero-scedastic)	IV-2SLS (Hetero-scedastic)
Coefficient of EATR		0.875	0.774	1.24	1.45	1.08	1.264	-0.681	0.775	0.964	1	0.943
p-value		0.001	0.004	0	0	0.002	0.026	0.266	0.114	0	0	0.097
LDV		0.705	0.719	0.664	0.637	0.799	No	No	0.719	0.737	0.689	0.677
Controls		No	No	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes
Country Fixed Effect		Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy		No	No	No	Yes	No	No	No	No	No	No	No
idreu		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
Italy excluded		No	Yes	No	No	No	No	Yes	No	No	No	No
AR1		No	No	No	No	No	0.653	0.556	No	No	No	
T		25	25	25	25	25	26	26	25	25	25	25
N		9	8	8	8	8	8	7	9	9	9	8
Obs		213	188	174	174	174	181	156	213	213	211	172
R2		0.915	0.92	0.927	0.942	0.919	0.662	0.765			0.701	0.715

4.5. Discussion

In spite of having a relatively small sample of countries and a limited number of observations, the results show that a synchronicity exists between the reduction of corporate taxation and the decline in the Bismarckian funding of social protection. Although not spectacular (see Figure 6 below), this synchronicity is stronger than a simple common trend between two distinct phenomena: both processes occur at different periods of time but are correlated in most Bismarckian countries. Moreover, none of the concurrent explanations found in the literature (trade openness, decline in manufacturing, labour cost, etc.) makes a better contribution to explaining the variation of the DV than my explanatory variable. Robustness checks tend to validate this relationship, but to moderate its estimate (whereas the point estimate in the first regression is 0.11, checks shows that 0.05 seems to be a more likely value). The meaning is that a decline of 10 points of effective corporate taxation reduces the variation of the contribution rate by 0.5 points of contribution per year. Among our country sample, the average variation of the contribution rate was +1 points per year between 1980 and 1985, and +0.1 point per year between 2000 and 2005. So up to half of this deceleration could be ascribed to the indirect political effect of the decline of corporate taxation.

Figure II- 6: Co-variation of EATR and difference in contribution rate



Standardised value of the annual variation of contribution rate and of EATR

5. Conclusion

This paper proposes a new theoretical explanation of the unexpected emergence of a model mixing insurance and assistance in Bismarckian countries. To summarise, whereas the level of social protection expenditure has kept growing, the social contribution rate has been virtually frozen at a point in time (varying from one country to another). Surprisingly enough, there was no massive shift in social contribution revenue to other taxes: the biggest change in social protection funding structure was attributable to increases in budgetary expenditure, not the collapse of social security contributions.

I argue that this change can be traced back to change in economic interests among social partners: whereas the level of social protection expenditure is driven by social demand, its funding (and it in turn the greater or lesser focus on insurance or assistance in its design) depends on the strategic interaction between economic and political actors. As long as unions' bargaining power was backed by the credible threat of taxing profit at a high rate, firms had a strong incentive to support the Bismarckian compromise and to prefer social insurance to universal assistance. Let us be clear that it is not assumed here that firms used to support

social insurance for itself (as it is sometimes claimed in the *variety of capitalism* literature, e.g. Estevez-Abe et al. [2001]), but they supported it as the best possible alternative in a constrained context.

Globalisation precisely changed this context. First, in the discourse, salient issues such as the high level of unemployment or the fear of relocation gave arguments to support supply-side policies: public debate on social protection funding permanently underlined the fact that any option would work as a disincentive for investment.[43] But beyond these elements, probably the most important change has in fact been the decreasing ability of governments to tax the profits of multinational firms, because of tax competition and increasing financial openness. Given this new context, employers' associations have defected from the historical compromise of funding social protection through social contributions levied on wages.

This analysis may contribute to existing literature in several ways. First it tends to show that, as expected by scholars in the 1990s, tax competition triggered institutional reform and had distributive consequences. But contrary to what was expected, it did not immediately entail a collapse in social protection expenditure. Instead, it led to a search for a new tax base (household capital, income and consumption) to fund new benefits, and in turn to complement existing social insurance by assistance schemes (because it was impossible to increase the scope of insurance).[44]

Second, it stresses that political economy modelling of social protection should pay attention to the coexistence between insurance and assistance to cover the same risk. Indeed, even in the simple model presented above, it is shown that the political interactions between insurance and assistance may be of a different nature: choosing between insurance and assistance not only implies the choice between more or less generous or redistributive benefits, it also implies the choice of a tax base, which is likely to have major distributive consequences, not only between workers, but also between capital and labour. Moreover, the political attitude of individuals in respect of one scheme (insurance or assistance) may be modified or manipulated by modifying another scheme. For instance, support for an earnings-related scheme (pensions or unemployment) among low-wage workers may vary as a function of the

[43] An illustration of this discourse one can be found in a column by Bourdieu (1996) and a quote from former Bundesbank chairman Hans Tietmeyer: "The challenge today is to create the conditions for sustainable growth and investor confidence. We must therefore control government budgets, reduce the level of taxes to bring them to a sustainable long-term level and social protection systems."

[44] Appendix 7.3 propose a decomposition of budgetary social expenditure by type of tax base and type of taxation.

generosity of the assistance covering the same risk. Conversely, since nobody wants to pay twice for the same risk, the presence of social insurance covering a large share of the population may be an obstacle to the implementation of an assistance scheme targeted on the poor (witness so-called "Obamacare").

Ultimately, it adds support to the claim that the politics of social protection in Bismarckian countries cannot be addressed properly if the governance mechanism of the various schemes is not addressed. Whereas this has been widely documented in qualitative political science literature, this dimension is generally overlooked by formal and quantitative analysis, in which social security expenditure is generally not distinguished from other forms of tax and transfers.

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7. Appendices

7.1. Model

7.1.1. Cost-sharing of taxation when funding flat-rate or earnings-related benefits

In this appendix, I endogenise the cost-sharing of labour taxation between firms and workers. The basic idea is that the share of tax that is perceived as an expected benefit is entirely borne by the employee i. The remaining part (the *"deadweight loss",* or the distortive share of taxation) is shared between the employer and employees, in accordance with their relative bargaining power k_i. k_i takes a value of between 0 and 1, 1 being the case where the relative bargaining power of the employer is infinite.

a/The cost of taxation funding earnings-related benefits (i.e. social security contributions)

Distortive share:

The distortive share is the share of taxation that is not perceived as funding expected benefits. For the individual i it is:

$$c * w_i(1-\varphi_i) - \varphi_i * \alpha * c * w_i = c * w_i * ((1-\varphi_i) - \varphi_i * \alpha)$$

share of c borne by worker i:

$$\gamma_i * (1-\varphi_i) = \varphi_i * \alpha + k_i * ((1-\varphi_i) - \varphi_i * \alpha)$$

it yields:

$$\gamma_i = \frac{\varphi_i * \alpha * (1-k_i)}{(1-\varphi_i)} + k_i$$

is the share of social security contributions supported by worker i

b/Taxation funding of flat-rate benefits (taxes)

Deadweight loss:

$$t * w_i(1-\varphi_i) - \varphi_i * B * t = t * ((1-\varphi_i)w_i - \varphi_i * B)$$

share of t borne by worker i:

$$\delta_i * w_i * (1 - \varphi_i) = \varphi_i * B - k_i * ((1 - \varphi_i)w_i - \varphi_i * B)$$

It yields:

$$\delta_i = \frac{\varphi_i * B * (1 - k_i)}{(1 - \varphi_i)w_i} + k_i$$

with

$$B = \frac{(1 - \varphi_{sk})}{\varphi_{sk} + 1} * (\mu * \pi + w_{sk})$$

thus,

$$\delta_i = \frac{\varphi_i * (\mu * \pi + w_{sk}) * (1 - k_i)}{(\varphi_{sk} + 1)w_i} + k_i$$

Comment:

When the ability to tax profit μ increases, the share of labour taxation borne by labour also increases (because the expected benefits increase). Indirectly, this is a channel through which a share of profit taxation is shifted back to workers.

c/Taxation funding of flat-rate benefits (taxes) re-expressed with the help of θ and *t'*

$$\theta = \frac{\delta * t}{t'} = \frac{\delta * w_{sk}}{(\pi * \mu + w_{sk})}$$

$$\theta(\mu) = \frac{\varphi_i * (1 - k_i)}{(\varphi_{sk} + 1)} + k_i * \frac{w_{sk}}{\pi * \mu + w_{sk}}$$

$\theta(\mu)$ is thus a decreasing function of μ: when the ability to tax profits increases, the distortion of labour taxation decreases (because the amount of the expected benefit increases).

d/ Important comment

It is possible for γ_i or δ_i to have a value higher than 1: if the expected benefit is higher than the taxation levied on the wage, an increase in taxation (and the expected benefit) can entail a decline in labour cost. To put it differently, theoretically, there is no reason why a distortion of the labour cost due to taxation can only raise the labour cost. Most probably, it is likely to raise the labour cost of some workers and lower that of others (those who are included in the scheme but whose wages are taxed less than their expected benefit).

7.1.2. Model: Preferences of skilled workers and firms in respect of *c*

Preference of skilled workers in respect of social insurance:

$$U_{sk}(c) = U_{sk}\left(c, t'^{*}_{sk}(c)\right)$$

$$\frac{dU_{sk}\left(c, t'^{*}_{sk}(c)\right)}{dc} = \frac{\alpha * \theta * w_{sk} - D * \gamma_{sk}}{D * (1 - \gamma_{sk} * c) + \alpha * c * \theta * w_{sk}}$$

and the preference of SK in respect of c is given by

$$\frac{dU_{sk}\left(c, t'^{*}_{sk}(c)\right)}{dc} > 0 \Leftrightarrow \theta < \frac{D * \gamma_{sk}}{\alpha * w_{sk}}$$

SK prefers to increase the level of social insurance (and decrease the level of social assistance) as long as θ is higher than $\frac{D*\gamma_{sk}}{\alpha*w_{sk}}$.

Notably the sign of $\frac{dU_{sk}(c,t(c))}{dc}$ does not depends on c.[45] Put differently, skilled workers either prefer a pure assurance or a pure assistance equilibrium. An outcome in which insurance and assistance coexist can only be reached as a second best.

Preference of firms in respect of social insurance:

$$\frac{dU_{firm}(c,t'(c))}{dc} = -w_{sk}(1-\varphi_{sk}) * ((1-\theta) * \frac{dt'(c)}{dc} + (1-\gamma_{sk}))$$

$\frac{dU_{firm}(c,t\prime(c))}{dc}$ is constant in respect of c and continuous in respect of c=(0;1).

That is to say that firms also prefer a pure insurance or a pure assistance solution, according to the sign of $\frac{dU_{firm}(c,t\prime(c))}{dc}$.

This sign varies over the value of θ:

$$\frac{dU_{firm}\big(c,t'(c)\big)^2}{dc * d\theta} = -w_{sk} * (1-\varphi_{sk}) * \left[\frac{\varphi_{sk} * \gamma_{sk}}{\theta^2} + \alpha * (\varphi_{sk}+1)\right] < 0$$

Thus $\frac{dU_{firm}(c,t\prime(c))}{dc}$ continuously decreases over θ, as long as $\theta > 0$.

By computing values of $\frac{dU_{firm}(c,t\prime(c))}{dc}$ for different values of θ,[46] it can be shown that:

$$\exists!\ \bar{\theta}\ \epsilon\ ]0;1]\ so\ that\ \frac{dU_{firm}\big(c,t'(c)\big)}{dc}(\bar{\theta}) = 0$$

and

$$1 > \bar{\theta} > \frac{D * \gamma_{sk}}{\alpha * w_{sk}}$$

[45] At least as long as $t' = t'^{*}_{sk}(c)$, i.e. as long as there is a possible trade-off between *c* and *t*.

[46] Limit in 0+, in $\frac{D*\gamma_{sk}}{\alpha*w_{sk}}$ and in 1

7.2. Robustness checks and additional econometrics

7.2.1. First estimate

Table AII- 1: With and without the explanatory variable

	(1) dcontribra~g	(2) dcontribra~g
EATR IFS		0.113**
		(0.001)
Observations	235	193
R-squared	0.012	0.081

p-values in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Robustness checks:

Table AII- 2: Re-estimate over a sub-time period (replication of Table 2, column 1)

	(1) dcontri~g	(2) dcontri~g	(3) dcontri~g
EATR IFS	0.155*	0.109	0.113**
	(0.017)	(0.086)	(0.001)
idreu	0.00613*	-0.0158	0.00872*
	(0.024)	(0.057)	(0.010)
Observations	82	111	193
R-squared	0.110	0.086	0.081

p-values in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Fixed effect and Paris-Winsten transformation included.

The first column of table AII-2 is an estimate between 1980 and 1992, the second between 1993 and 2005, and the third over the entire timeframe.

Table AII- 3: Replication of Table 2 without country fixed effect

	(1) dcontri~g	(2) dcontri~g	(3) dcontri~g	(4) dcontri~g	(5) dcontri~g	(6) dcontri~g	(7) dcontri~g	(8) dcontri~g	(9) dcontri~g	(10) dcontri~g
EATR IFS	0.0564**	0.0586**	0.0718**	0.0528**	0.0565**	0.0556	0.0575**	0.0533**	0.117*	0.0877*
	(0.008)	(0.005)	(0.003)	(0.008)	(0.008)	(0.088)	(0.006)	(0.009)	(0.011)	(0.041)
senior		-0.00787							0.0795	0.123
		(0.942)							(0.535)	(0.466)
Unemplrate		0.0286							-0.00642	-0.0162
		(0.194)							(0.796)	(0.535)
lrgovseats			0.000143						0.000210*	0.000200*
			(0.131)						(0.025)	(0.020)
IPC				0.000740					0.00127	-0.000465
				(0.246)					(0.194)	(0.751)
salgrowth					0.0111				-0.0215	0.0737
					(0.828)				(0.703)	(0.353)
manufacturing						0.00120			-0.120	-0.104
						(0.981)			(0.121)	(0.215)
extra							-0.00458		-0.00782	-0.00584
							(0.353)		(0.144)	(0.199)
kaopen								-0.00155	-0.00180	-0.00266
								(0.397)	(0.388)	(0.358)
growth									-0.00847	0.0203
									(0.533)	(0.619)
Observations	193	193	182	193	193	193	193	193	182	182
R-squared	0.032	0.035	0.055	0.049	0.032	0.032	0.037	0.040	0.109	0.285

p-values in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table AII- 4: replication in first differences

	(1) D.dcont~g	(2) D.dcont~g
D.EATR IFS	0.191*	0.242***
	(0.012)	(0.001)
D.senior		-0.198
		(0.730)
D.Unemplrate		0.147
		(0.203)
D.lrgovseats		0.000229*
		(0.040)
D.IPC		0.000635
		(0.642)
D.salgrowth		0.106
		(0.177)
D.manufacturing		-0.0333
		(0.948)
D.extra		-0.0764
		(0.080)
D.kaopen		0.00336
		(0.468)
D.growth		-0.0210
		(0.114)
Constant	0.000498	0.00141
	(0.713)	(0.607)
Observations	184	173
R-squared	0.050	0.145

p-values in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table AII- 5: Allowing heterogeneous coefficients

	(1) dcontribra~g	(2) dcontribra~g	(3) dcontribra~g
main			
eatrifs	0.0858	0.0526**	0.00861
	(0.059)	(0.006)	(0.589)
bismcoun			-0.0137
			(0.055)
eatrbismcoun			0.0472
			(0.058)
N	193	193	294
R-sq			

p-values in parentheses
* p<0.05, ** p<0.01, *** p<0.001

The first column of table AII- 5 is the estimate of the weighted average coefficient from Pesaran and Smith (1995). The last two columns correspond to the restricted maximum likelihood estimator of coefficients (xtmixed under stata), allowing a random component and Prais-Winsten transformation.

Table AII- 6: Re-estimate by dropping countries one by one (cross-validation)

	country	coef
26.	Austria	.1734394
58.	Belgique	.1748242
154.	France	.217418
186.	Germany	.2011465
218.	Grèce	.1699848
282.	Italie	.1079172
314.	Luxembourg	.1699848
346.	Netherlands	.1259265
410.	Portugal	.17482
442.	Spain	.1723644

Coefficients of Table AII- 6 correspond to the PCSE estimate, including all controls when dropping one country. Dropping France raises the estimate, whereas dropping Italy leads to a weaker coefficient.

Table AII- 7 : PCSE with country-specific and uncorrelated coefficients, fixed effect and Prais-Winsten transformation included

	(1) dcontribra~g
eatrAU	0.0131 (0.439)
eatrBE	0.188*** (0.000)
eatrFR	0.0230 (0.728)
eatrGER	0.0493 (0.101)
eatrGR	0.0398 (0.765)
eatrIT	0.220 (0.077)
eatrNOR	0.0335* (0.021)
eatrPT	-0.0474 (0.179)
eatrSP	0.0990* (0.010)
Observations	294
R-squared	0.073

p-values in parentheses
* p<0.05, ** p<0.01, *** p<0.001

The level of significance is weak (the number of observations by country varies between 10 and 25). The sole country for which the estimated coefficient is negative is Portugal (only 12 observations).

Table AII- 8: Instrumented variable

	(1) dcontri~g	(2) dcontri~g	(3) dcontri~g	(4) dcontri~g	(5) dcontri~g	(6) dcontri~g	(7) dcontri~g	(8) dcontri~g	(9) dcontri~g
EATR IFS	0.0887**	0.0605	0.0994**	0.0729*	0.0908*	0.0561	0.0788*	0.0781	0.0788
	(0.004)	(0.177)	(0.004)	(0.044)	(0.015)	(0.332)	(0.031)	(0.077)	(0.214)
senior		-0.117							0.0186
		(0.293)							(0.885)
Unemplrate		0.0284							0.0131
		(0.550)							(0.801)
lrgovseats			0.000149*						0.000206*
			(0.037)						(0.019)
IPC				0.000770					0.00167*
				(0.112)					(0.018)
salgrowth					-0.0132				-0.0622
					(0.813)				(0.464)
manufacturing						0.0845			0.00560
						(0.348)			(0.967)
extra							-0.00932		-0.00631
							(0.392)		(0.594)
kaopen								-0.000901	0.000118
								(0.574)	(0.945)
growth									-0.000510
									(0.957)
Observations	191	191	180	191	191	191	191	191	180
R-squared	0.095	0.098	0.123	0.110	0.097	0.091	0.094	0.094	0.171

p-values in parentheses
* p<0.05, ** p<0.01, *** p<0.001

EATR is here instrumented by all variables plus l.eatrifs and l.eatrmean (lagged value of the average EATR across countries). Fixed effect is included but Prais-Winsten transformation is not. p values are robust to heteroscedasticity.

The instrumentation tests (displayed below here for the first column) support the assumption that the instruments are strong enough and appropriately identified. The test for each column leads to comparable conclusions.

Table AII- 9: Tests of validity of the instrumentation

```
Underidentification test (Kleibergen-Paap rk LM statistic):              62.961
                                                  Chi-sq(2) P-val =    0.0000
------------------------------------------------------------------------------
Weak identification test (Kleibergen-Paap rk Wald F statistic):         215.723
Stock-Yogo weak ID test critical values: 10% maximal IV size             19.93
                                         15% maximal IV size             11.59
                                         20% maximal IV size              8.75
                                         25% maximal IV size              7.25
Source: Stock-Yogo (2005).  Reproduced by permission.
NB: Critical values are for Cragg-Donald F statistic and i.i.d. errors.
------------------------------------------------------------------------------
Hansen J statistic (overidentification test of all instruments):         0.186
                                                  Chi-sq(1) P-val =    0.6659
------------------------------------------------------------------------------
Instrumented:         eatrifs
Included instruments: idreu
Excluded instruments: L.eatrifs L.eatrmean
------------------------------------------------------------------------------
```

The point estimate is weaker than without instrumentation, but positive and stable. eatrifs and manufacturing are not significant together (probably because of a collinearity higher than 0.4). However regression of the DV on manufacturing alone and EATR alone show that the explanatory variable of EATR is much higher than the explanatory power of manufacturing (R2 of 0.10 vs R2 of 0.04).

7.2.2. Second estimate

Table AII- 10: Replication of Table 3 without fixed effect

	(1) Standar~x	(2) Standar~x	(3) Standar~x	(4) Standar~x	(5) Standar~x	(6) Standar~x	(7) Standar~x	(8) Standar~x
lbismstd	0.918***	0.921***	0.905***	0.921***	0.901***	0.914***	0.929***	0.799***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EATR IFS	0.133	0.0200	0.250	0.324*	0.758***	0.552***	0.404*	1.083**
	(0.236)	(0.867)	(0.113)	(0.046)	(0.000)	(0.000)	(0.014)	(0.002)
bismcoun	0.0867**	0.00253						
	(0.004)	(0.963)						
eatrbismcoun		0.289						
		(0.062)						
Unemplrate			0.272					0.0625
			(0.182)					(0.831)
senior			-0.684					-2.748**
			(0.299)					(0.004)
extra				0.0315				-0.135**
				(0.312)				(0.002)
manufacturing					-0.804**			-1.615*
					(0.004)			(0.022)
manulabcost						0.0628		0.220
						(0.601)		(0.165)
IPC						-0.00526		0.00125
						(0.193)		(0.859)
lrgovseats							0.000550	0.000728
							(0.437)	(0.315)
Observations	329	329	213	200	201	213	187	174
R-squared	0.964	0.965	0.896	0.900	0.904	0.901	0.903	0.919

p-values in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table AII- 11: Replication of Table 3 without LDV. Fixed effect and Prais-Winsten transformation are included

	(1) Standar~x	(2) Standar~x	(3) Standar~x	(4) Standar~x	(5) Standar~x	(6) Standar~x	(7) Standar~x	(8) Standar~x
EATR IFS	0.945**	0.125	0.810	1.777***	1.165*	1.129*	2.288***	1.264*
	(0.003)	(0.739)	(0.076)	(0.000)	(0.013)	(0.013)	(0.000)	(0.026)
bismcoun	0.657***	0.142						
	(0.000)	(0.409)						
eatrbismcoun		1.860***						
		(0.000)						
Unemplrate			-1.463					-1.521*
			(0.097)					(0.043)
senior			-7.993***					-5.780*
			(0.000)					(0.032)
extra				-0.0276				0.0943
				(0.923)				(0.777)
manufacturing					3.965***			-0.201
					(0.001)			(0.899)
manulabcost						-0.949**		-0.871*
						(0.002)		(0.037)
IPC						0.000810		-0.0119
						(0.908)		(0.304)
lrgovseats							0.000719	0.000774
							(0.477)	(0.410)
Observations	342	342	221	208	208	221	194	181
R-squared	0.716	0.759	0.587	0.554	0.583	0.554	0.595	0.662

p-values in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table AII- 12: Replication of Table 3, column 8, with (first column) and without (second column) year dummies

	(1) Standardiz~x	(2) Standardiz~x
lbismstd	0.664***	0.637***
	(0.000)	(0.000)
EATR IFS	1.245***	1.145***
	(0.000)	(0.000)
lrgovseats	0.000421	0.00109
	(0.564)	(0.169)
Unemplrate	-0.204	-1.920*
	(0.622)	(0.012)
senior	-1.032	5.545*
	(0.400)	(0.015)
extra	-0.0285	0.319
	(0.867)	(0.051)
manufacturing	0.144	-2.770
	(0.880)	(0.060)
manulabcost	-0.322	-0.722
	(0.130)	(0.063)
IPC	-0.00897	0.00281
	(0.291)	(0.814)
Observations	174	174
R-squared	0.927	0.942

p-values in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Table AII- 13: Allowing heterogeneous coefficients

	(1) bismstd	(2) bismstd
main		
lbismstd	0.717***	0.737***
	(0.000)	(0.000)
eatrifs	0.775	0.965***
	(0.114)	(0.000)
N	213	213
R-sq		

p-values in parentheses
* p<0.05, ** p<0.01, *** p<0.001

The first column is the estimate of the weighted average coefficient from Pesaran and Smith (1995). The second column corresponds to the restricted maximum likelihood estimator of coefficients (xtmixed under stata), allowing a random component.

Table AII- 14: Re-estimate by dropping countries one by one

	country	coef	coef2	coef3
26.	Austria	1.306505	.9916064	1.557602
58.	Belgique	1.314301	1.050859	1.605897
154.	France	1.790938	1.511096	2.335229
186.	Germany	1.406429	1.624509	2.003787
218.	Grèce	1.245103	1.082631	1.640087
282.	Italie	.0034481	.6524515	1.225964
314.	Luxembourg	1.245103	1.082631	1.640087
346.	Netherlands	1.204839	1.016783	1.74649
410.	Portugal	1.174087	1.085166	1.509646
442.	Spain	1.379098	1.324765	1.977418

coef corresponds to the model with LDV and fixed effect, *coef2* to the model without fixed effect. *coef3* is the model without LDV and FE with AR1. Italy is a strong outlier. The effect is only robust to the exclusion of Italy from the sample in the third specification (the one advocated by Plümper et al. [2005]).

Table AII- 15: Instrumented variable

	(1) Standar~x	(2) Standar~x	(3) Standar~x	(4) Standar~x	(5) Standar~x	(6) Standar~x	(7) Standar~x	(8) Standar~x	(9) Standar~x
EATR IFS	1.009***	0.785*	1.310***	1.281***	0.806*	1.013**	0.782*	1.085***	0.943
	(0.000)	(0.020)	(0.000)	(0.000)	(0.047)	(0.001)	(0.038)	(0.001)	(0.097)
senior		-0.501							-1.672
		(0.616)							(0.247)
Unemplrate		0.759							0.343
		(0.085)							(0.432)
lrgovseats			0.000551						0.00121
			(0.424)						(0.114)
IPC				-0.00601					-0.0113
				(0.066)					(0.120)
salgrowth					0.0827				1.080
					(0.832)				(0.133)
manufacturing						0.853			-0.209
						(0.227)			(0.873)
extra							-0.168		-0.0129
							(0.140)		(0.916)
kaopen								0.00629	-0.00626
								(0.622)	(0.743)
growth									-0.174
									(0.111)
Observations	211	211	185	211	198	199	199	211	172
R-squared	0.701	0.706	0.726	0.707	0.672	0.716	0.660	0.702	0.715

p-values in parentheses
* p<0.05, ** p<0.01, *** p<0.001

EATR is here instrumented by all variable plus l.eatrifs (lagged value of EATR) and l.eatrmean (lagged value of the average EATR across countries). Fixed effect is included but Prais-Winsten transformation is not. p values are robust to heteroscedasticity.

Table AII- 16: Test of validity of instruments (first column case)

```
Underidentification test (Kleibergen-Paap rk LM statistic):              48.460
                                                    Chi-sq(2) P-val =    0.0000
------------------------------------------------------------------------------
Weak identification test (Kleibergen-Paap rk Wald F statistic):         371.040
Stock-Yogo weak ID test critical values: 10% maximal IV size             19.93
                                         15% maximal IV size             11.59
                                         20% maximal IV size              8.75
                                         25% maximal IV size              7.25
Source: Stock-Yogo (2005).  Reproduced by permission.
NB: Critical values are for Cragg-Donald F statistic and i.i.d. errors.
------------------------------------------------------------------------------
Hansen J statistic (overidentification test of all instruments):         0.674
                                                    Chi-sq(1) P-val =    0.4116
------------------------------------------------------------------------------
Instrumented:         eatrifs
Included instruments: lbismstd idreu
Excluded instruments: L.eatrifs L.eatrmean
------------------------------------------------------------------------------
```

7.2.3. Inclusion of the share of health expenditure in social protection expenditure

Table AII- 17: Variation of contribution rate and Bismarckian index (with LDV) and EATR, when the share of health expenditure is included (OLS with fixed-effect)

	(1) dcontri~g	(2) Standar~x
EATR IFS	0.133	1.504
	(0.056)	(0.054)
sharehealth	0.140	1.479
	(0.329)	(0.373)
idreu	0.00519	-0.0983
	(0.700)	(0.582)
L.Standardized~x		0.516***
		(0.001)
Constant	-0.0759	-0.552
	(0.127)	(0.292)
Observations	39	43
R-squared	0.132	0.572

p-values in parentheses
* p<0.05, ** p<0.01, *** p<0.001

7.3. Who pays for the expansion of tax-funded social security in Bismarckian country?

Analytically one cannot determine straightforward who pays for the expansion of tax-funded social security. In contrary to social contributions, most of tax-receipts are not earmarked; some of earmarked taxes were earmarked *a posteriori*, i.e. many years after their implementation. Consequently all kinds of taxes contribute to fund tax-funded social security. Moreover the increase in tax-funded social security receipts is weakly correlated to the general evolution of tax receipts (correlation coefficient of 0.25 in average). Hence one cannot directly link the size of government's budget and social security expansion: a significant share of social security is funded not only by new taxes but through cuts in other public expenses. To determine the tax base of the expansion of social security, I consider it as a standard budgetary expansion paid by the average tax-payer. I used OECD data of tax structure.

7.3.1. Average contribution of Corporation, Households and Consumption to variation in social protection

Following OECD (2001) I compute an indicator of the relative share of taxation relying on households, corporation and consumption. On this basis I computed the cost of tax-funded social protection expansion (or retrenchment) relying on corporate, households and consumption (table A13 and A14). Results are computed for the period 1990-2007 and 1995-2007 and are in points of GDP.

Table AII- 18: Estimation of the evolution of tax-funded social protection receipts between 1990 and 2007

	Corporate	Households	Consumption	Total
	1990-2007			
Denmark	0.60	- 4.28	- 1.32	- 5.00
Norway	1.97	- 3.04	- 3.04	- 4.10
Netherlands	- 0.20	- 2.57	- 0.63	- 3.40
Luxembourg (Grand-Duché)	- 0.25	- 1.28	- 0.27	- 1.80
Austria	0.26	0.53	- 0.29	0.50
Finland	1.07	- 0.41	- 0.06	0.60
United Kingdom	- 0.03	1.49	0.25	1.70
Spain	0.78	1.11	0.71	2.60
Germany (including ex-GDR from 1991)	0.40	0.81	1.49	2.70
Italy	0.38	2.96	1.15	4.50
France	0.70	2.98	1.22	4.90

Own calculation, using OECD and Eurostat data.

Table AII- 19: Estimation of the evolution of tax-funded social protection receipts between 1995 and 2007

	Corporate	Households	Consumption	Total
	1995-2007			
Denmark	0.35	- 3.48	- 1.37	- 4.50
Norway	2.03	- 2.79	- 3.65	- 4.40
Finland	0.38	- 2.33	- 2.25	- 4.20
Sweden	0.22	- 1.89	- 1.93	- 3.60
United Kingdom	- 0.15	0.03	- 1.57	- 1.70
Netherlands	- 0.07	- 1.01	- 0.42	- 1.50
Luxembourg (Grand-Duché)	- 0.41	- 0.50	- 0.39	- 1.30
Ireland	0.31	- 0.03	- 0.77	- 0.50
Austria	0.33	- 0.21	- 0.52	- 0.40
Spain	0.95	0.24	0.01	1.20
Belgium	0.55	0.44	0.41	1.40
Germany (including ex-GDR from 1991)	0.55	0.35	0.90	1.80
Greece	0.49	1.40	0.41	2.30
France	0.56	2.04	0.50	3.10
Italy	0.31	2.38	0.91	3.60
Portugal	1.09	1.24	2.17	4.50

Own calculation, using OECD and Eurostat data.

The main result is that corporate tax revenue remained relatively stable, whereas an increase (decrease) in tax-funded social protection induced an increase (decrease) in households and consumption taxation.

Between 1990 and 2007, less than 15% of the tax-revenue dedicated to new social spending comes from corporate taxation in France Germany and Italy, less than 30% in Spain. Between 1995 and 2007 the share is slightly more important.

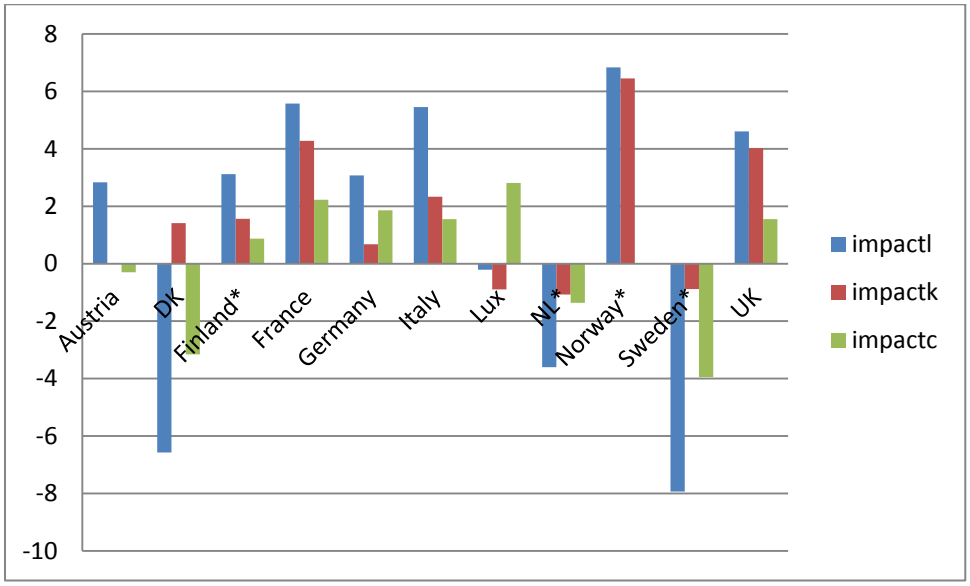
7.3.2. Implicit tax rate on capital, labour and consumption due to social protection expenditure

Based on the same assumption (social protection expenditure are paid by the average tax-payer), I compute the evolution of the implicit tax-rate due to social protection.

$$t_i^{sp} = \frac{t_i}{t_m} * sp$$

Where t_i^{sp} is the implicit tax rate on the tax base i due to social protection, t_i implicit tax rate on i, t_m is the average tax rate and *sp* is the level of budgetary social expenditure in GDP point. Here again social security contribution (and corresponding expenditure) are excluded.

Figure AII- 1: Change in implicit tax rate, due to budgetary SP expenditure 90-08 (points of tax rate)

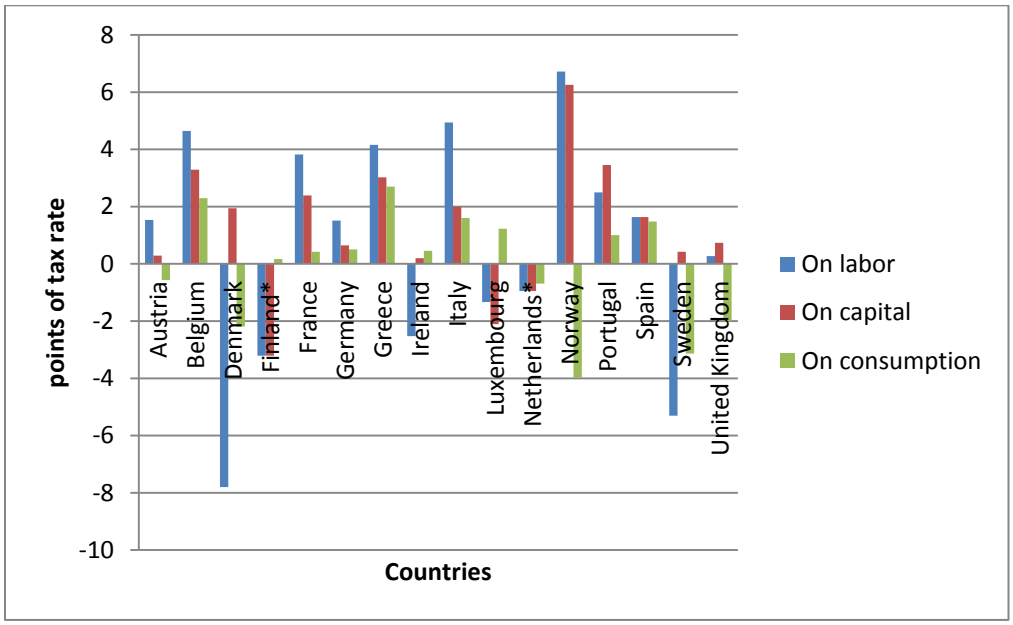


"impactl" (in blue) is the change in implicit labour taxation.

"impactk" (in red) is the change in implicit capital taxation.

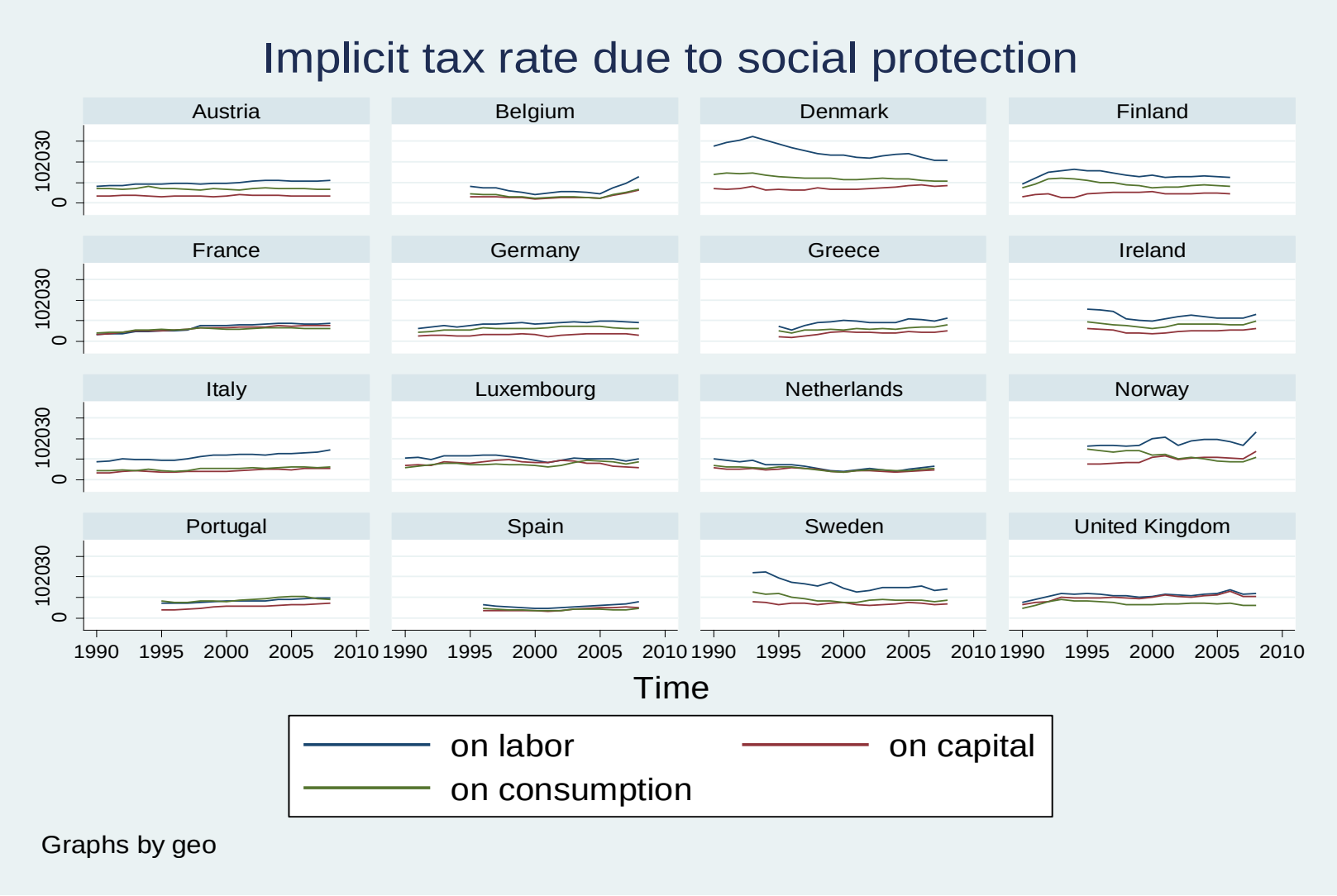
"impactc" (in green) is the change in consumption taxation.

Figure AII- 2: Change in implicit tax rate, due to budgetary SP expenditure 95-07



It is worth noticing that here the distinction is not between households and corporation but between labour and capital. Thus capital taxation includes the taxation of household's capital (higher in average than the taxation of the sole corporate profit). Examination of Figure A1, A2 and A3 shows that capital taxation in Bismarckian countries appears less sensitive than other form of taxation to increase in social protection expenditure. However capital taxation seems to contribute more to social protection in France and Spain than in Germany, Italy, Portugal Belgium and Austria.

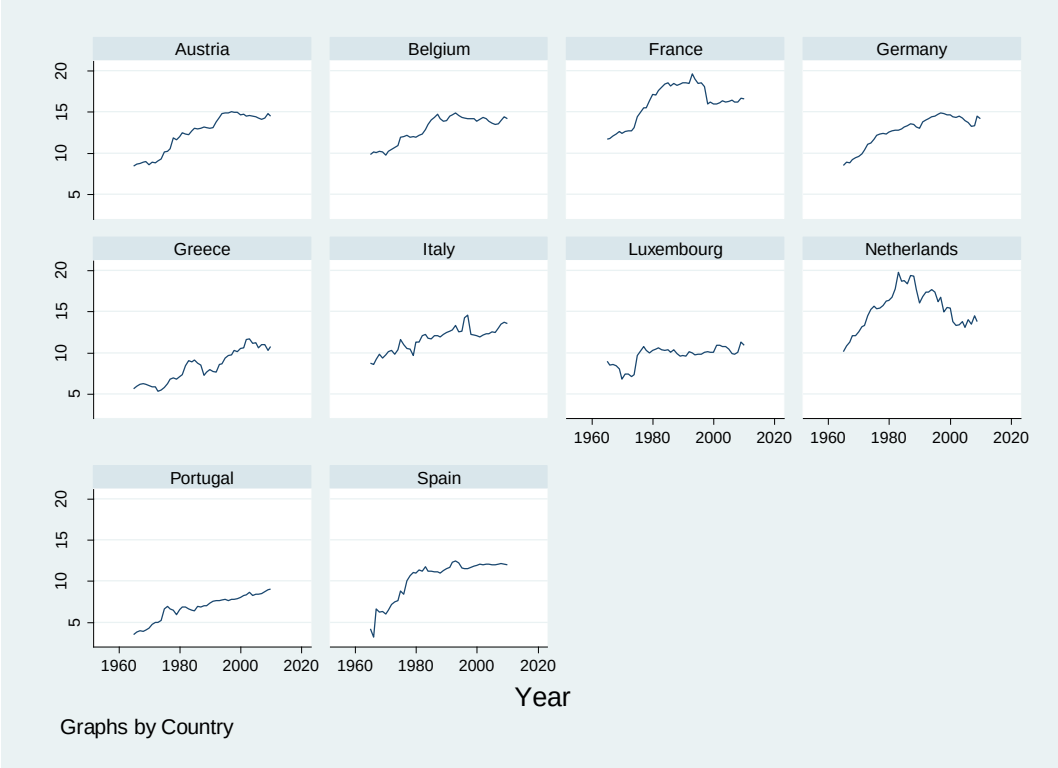
Figure AII- 3: Implicit tax rate related to social protection expenditure (own calculation, points of tax rate)



7.4. Long term evolution of social security contributions in Bismarckian countries

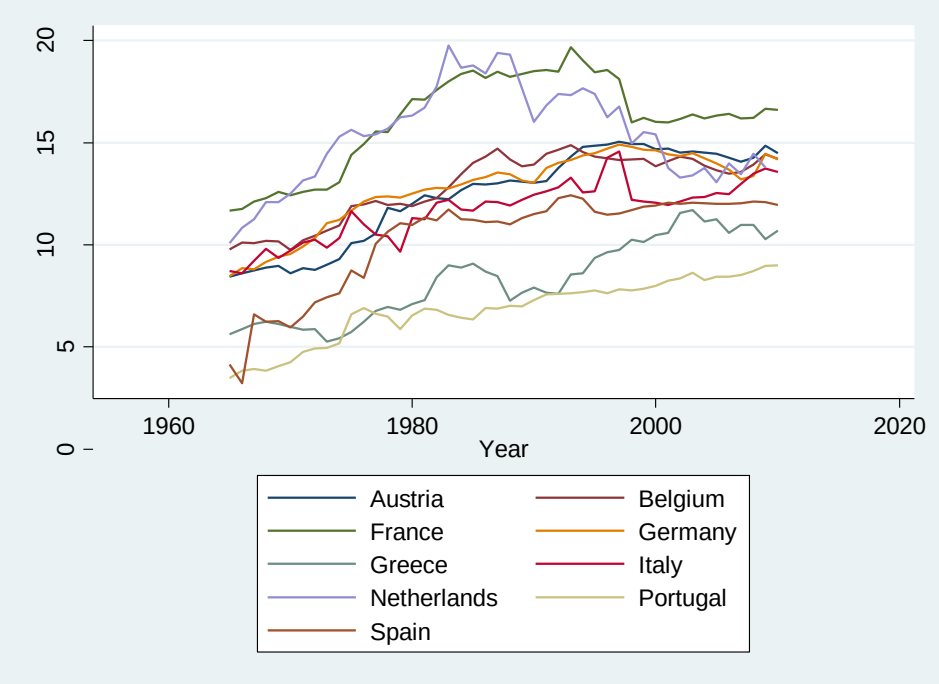
Social security contributions (here in point of GDP) grow fast during the 60-70's and attain a maximum point during the 80's or 90's. At this point they remain almost steady[47].

Figure AII- 4: Social security contributions by country 1965-2010 (points of GDP)



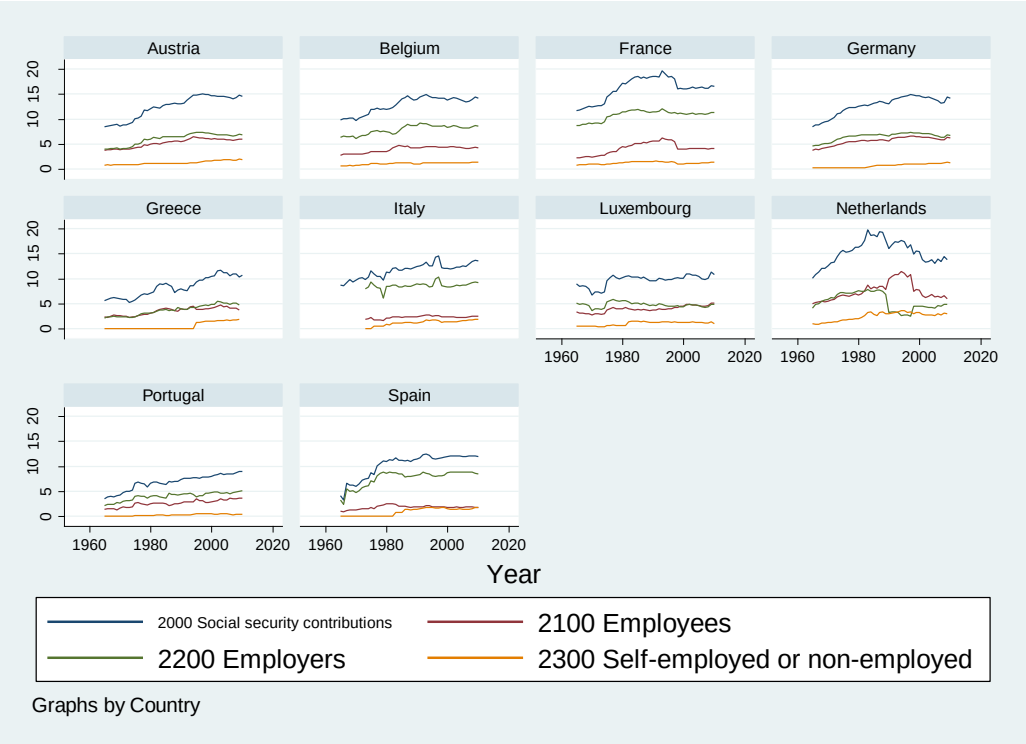
[47] Brutal decrease in France in 1998 is an artifact due to the transformation of a share of employees contribution into CSG.

Figure AII- 5: All countries together (points of GDP)



The maximum point is not attained at the same date for each country.

Figure AII- 6: Decomposition between employer and employee social contributions (points of GDP)



7.5. Is budgetary social protection expenditure funded through deficit spending?

Is the increasing trend of social protection expenditure in Bismarckian countries to ascribe to deficit spending? Manow (2010) stresses the correlation between welfare regime, independence of central bank and indebtedness level. Focusing on public spending in general his perspective is different of mine (I only focus on social protection spending), but he suggests that Bismarckian countries maintained a high level of social expenditure by running higher debts. A look at the co-variation of deficit spending and social protection expenditure brings some nuance to this result.

In the paper I stress the fact that budgetary expenditure have funded the most part of the increase in social expenditure of Bismarckian countries (whereas social contribution revenue have been rather steady). A good question is to determine whether this new budgetary expenditure has been funded through deficit spending or not. From an analytical point of view, the increase in budgetary social protection spending may be funded through three different channels i) raising tax-revenue ii) spending deficit iii) cutting other public expenditure. In this appendix I propose an analytical decomposition of the funding of social protection expenditure since 1980.

Results shows that the increase in social protection spending in Bismarckian countries can clearly not be ascribed to an increase in deficit spending, but primarily to cuts in other public expenditure and also to increase in tax-revenue. Obviously I do not pretend that the level of social spending has no relation with the level of public indebtedness: to some extent cutting social expenditure could be a means to reduce the deficit and thus the indebtedness. But for my concern it matters to determine whether new social expenditure have been funded through credit (thus through an inter-temporal trade-off) or if they have been paid on effective tax revenue.

7.5.1. Long term decomposition

I propose following analytical decomposition (delta is the difference between 1980 and 2007):

$$\Delta budgetary\ SP\ expenditure = \Delta deficit\ spending + \Delta Tax\ revenue - \Delta non\ SP\ public\ spending$$

Since social security contributions (SSC) are earmarked to social protection expenditure I subtract SSC both from SP spending, tax revenue and public spending, to focus on the sole balance between non SSC tax-revenue and budgetary spending.

Results are displayed in table AII- 20. This analysis from date to date is to consider carefully, since its results are highly sensitive to the economic cycle. For instance taking 1981 for starting points instead of 1980 for France reduces the deficit increase from 2.48 to 0.4 points of GDP. However these statistics tend to show that, France being an exception, the increase in public social expenditure cannot be related to an increase in deficit spending in Bismarckian countries, especially for countries with a rapid increase in social spending (e.g. Italy).

Figure A7 displays a decomposition of the variations of social protection expenditure including social security contribution and using different data (Eurostat ESSPRO) and different period (1990 and 2007). The results are comparable to the previous one

Figure AII- 7: The variations of SP expenditure 1990-2007

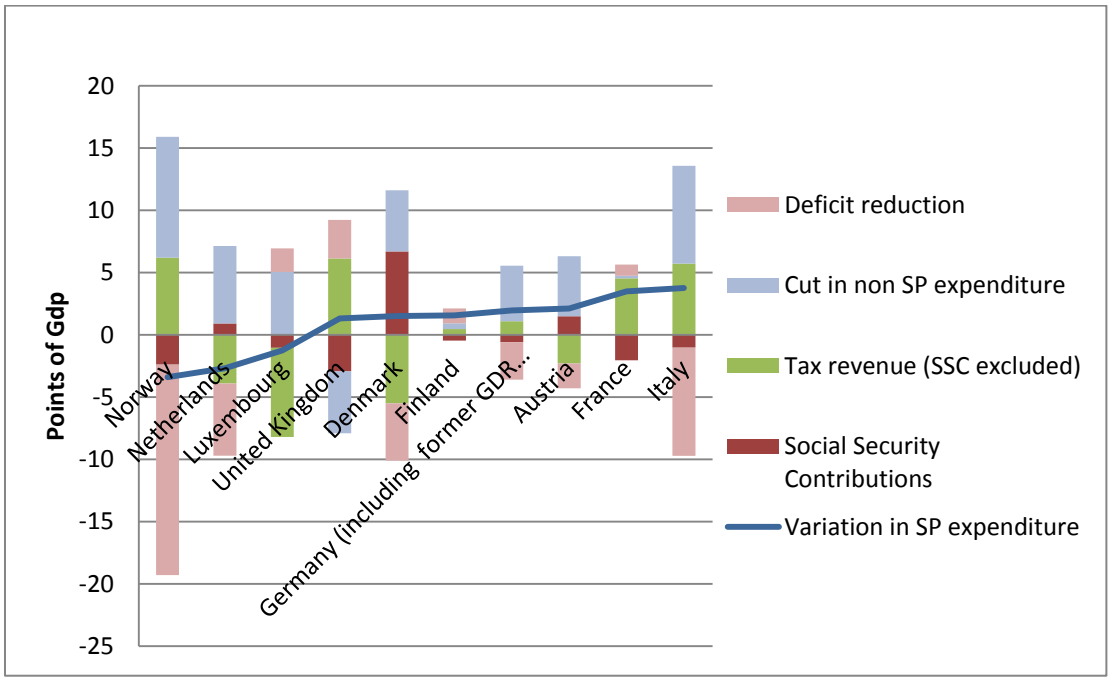


Table AII- 20: Variation of budgetary social protection spending, deficit spending, Tax revenue between 1980 and 2007 in points of GDP

	Variation in budgetary social protection expenditure	Variation in Net lending/net borrowing (- means increase in deficit or decrease in surplus)	Variation of other public expenditure (- means cut in public expenditure)	Variation in tax revenue	Time Period
Netherlands	-1.84	4.11	-5.21	-2.95	1980-2007
Austria	2.33	2.44	-8.84	-4.07	1980-2007
United Kingdom	3.14	0.54	-5.22	-1.54	1980-2007
Finland	3.21	1.51	0.49	5.21	1980-2007
Italy	5.19	5.48	0.20	10.86	1980-2007
France	8.68	-2.48	-0.99	5.20	1980-2007
Belgium	0.73	9.73	-10.33	0.12	1985-2007
Denmark	0.90	6.10	-5.57	1.44	1990-2007
Luxembourg	1.28	-0.62	-3.08	-2.42	1990-2007
Germany*	2.03	3.12	-4.09	1.06	1991-2007
Sweden	-8.14	14.75	-12.38	-5.77	1993-2007
Ireland	1.32	2.34	-6.12	-2.46	1993-2007
Norway	-1.96	14.27	-7.32	4.98	1995-2007
Spain	-0.24	8.39	-5.43	2.72	1995-2007
Greece	1.60	2.37	-3.09	0.88	1995-2007
Portugal	4.17	1.82	-3.22	2.77	1995-2007

Column1 = -column 2 –column 3 + column 4. OECD data

7.5.2. Dynamic descriptive statistics

For a more dynamic analysis of the co variations between deficit and social spending, I propose to compute the share of deficit spending that should be ascribed to social spending. I thus build following indicator:

$$Deficit_{Social\ Protection} = Deficit * \frac{Bugetary\ SP\ expenditure\ (SSC\ excluded)}{Total\ budgetary\ expenditure\ \ (SSC\ excluded)}$$

To avoid breaks in OECD series, data displayed above start in 1995 for some countries (Greece, Portugal, Spain for instance). However verifications made on old OECD series, including 1982 1984 1989 and 1990 for those countries do not change the analysis.

Whereas there is a clear correlation between deficit spending and social protection expenditure in liberal and Nordic countries (Denmark, Finland, Ireland, Norway, Sweden, UK), this is clearly not the case for our Bismarckian sample.

Figure AII- 8: Total Deficit and budgetary expenditure for SP purpose (points of GDP)

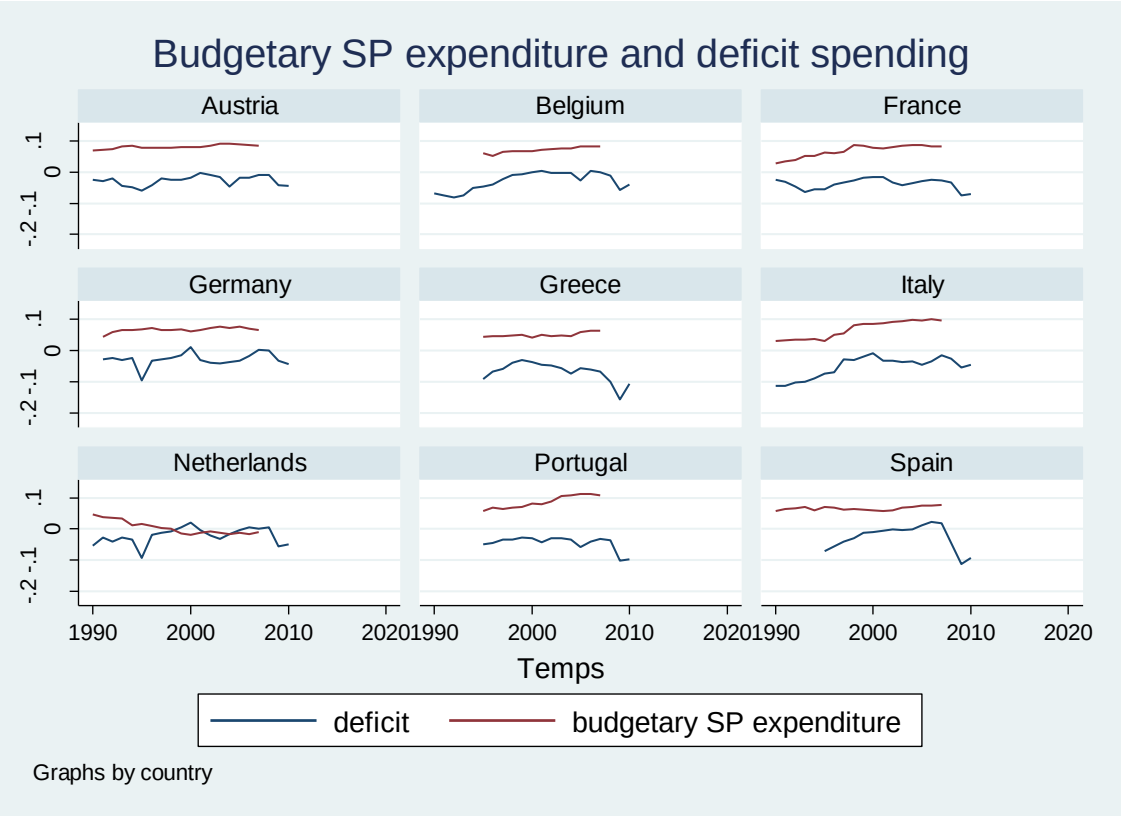
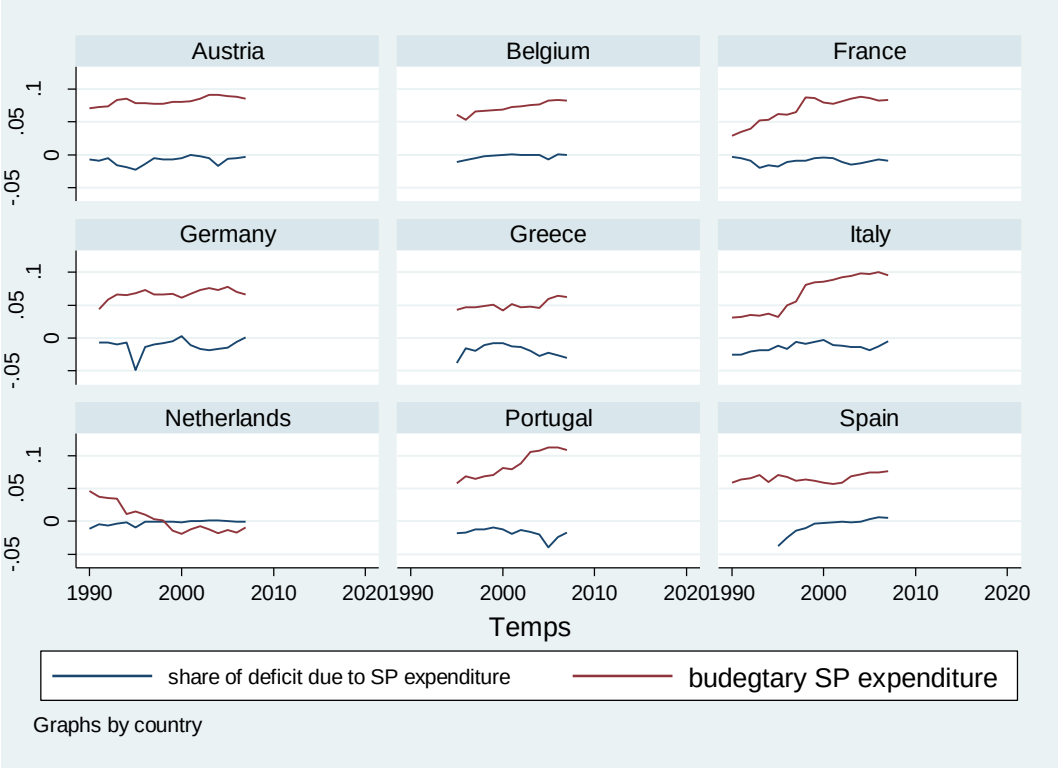


Figure AII- 9: Deficit spending due to SP expenditure (own calculation, points of GDP)



7.6. Evolution of SP expenditure by branch (in points of GDP)

Here are displayed OECD series on SP spending by branch (SOCX data base). Old age and health expenditure are the main components of social protection expenditure and the one with the fastest increase. Data also make obvious that complementarities exist between assistance and insurance (e.g. "survivor" assistance and "old age" pensions below) or between seemingly unrelated scheme (e.g. unemployment and disability in UK). This is one of the reasons why this paper consider together all type of social expenditure.

Figure AII- 10: Spending for Old age and Survivors (points of GDP)

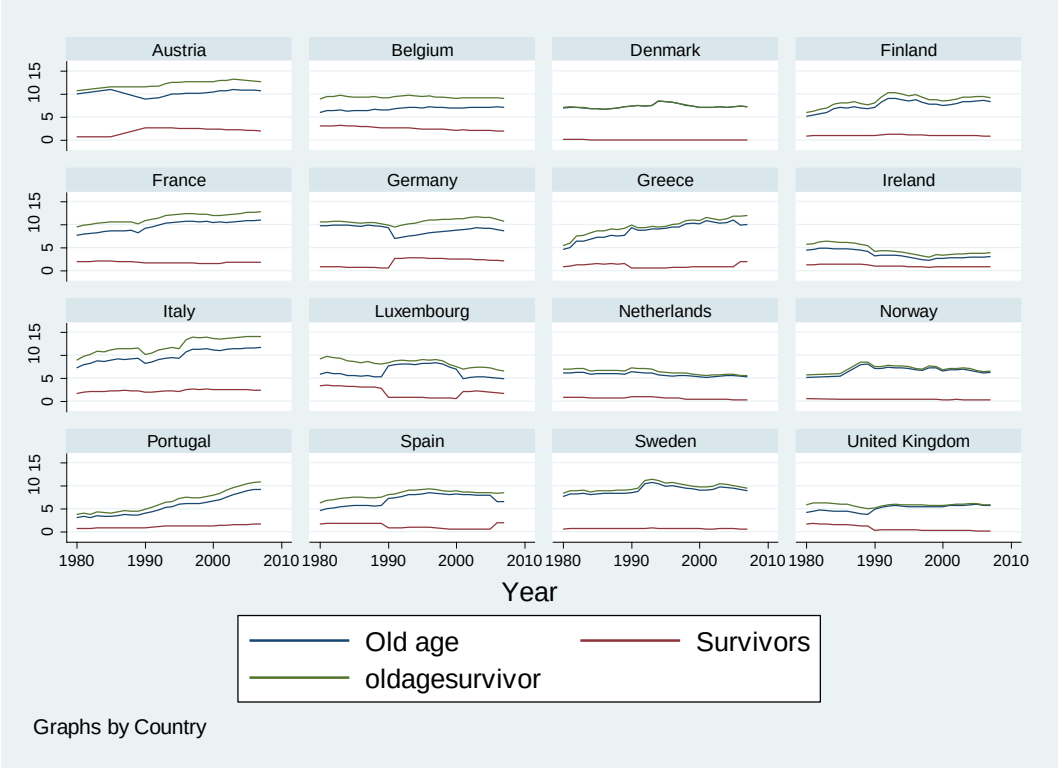


Figure AII- 11: Public health expenditure in points of GDP

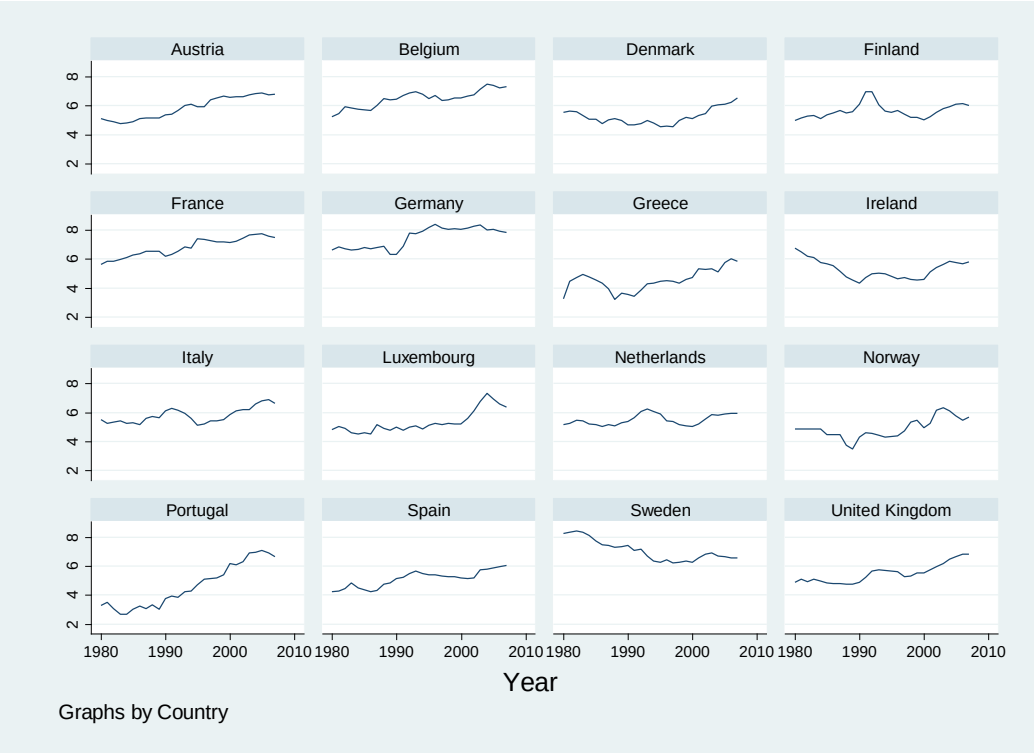


Figure AII- 12: Public Family expenditure in points of GDP

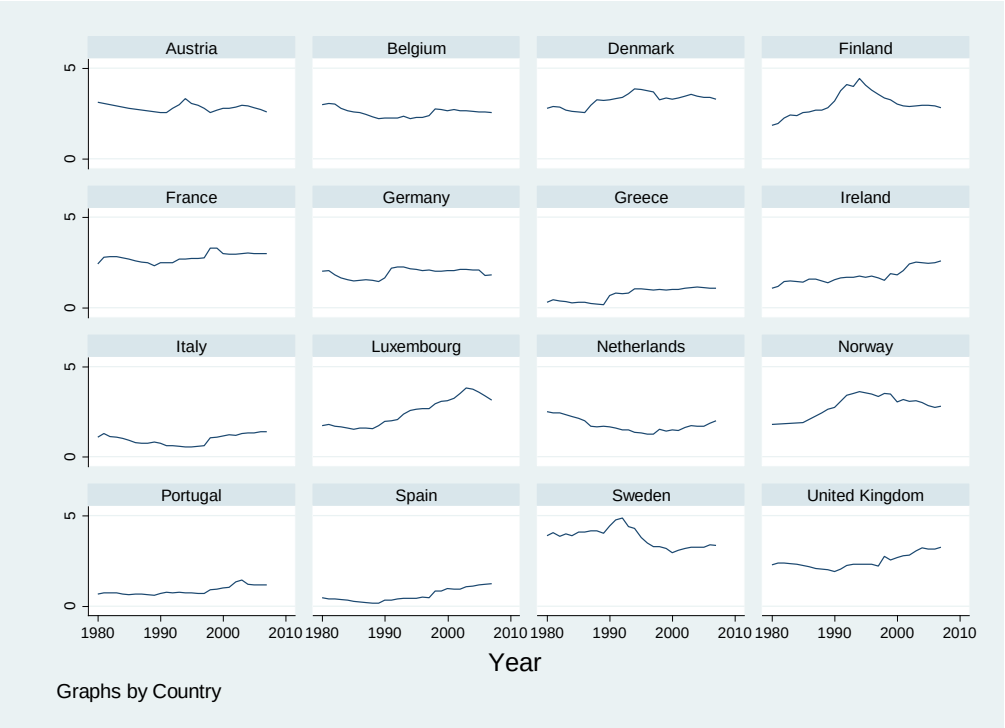


Figure AII- 13: "Public Housing" and "Other social policy areas" expenditure (points of GDP)

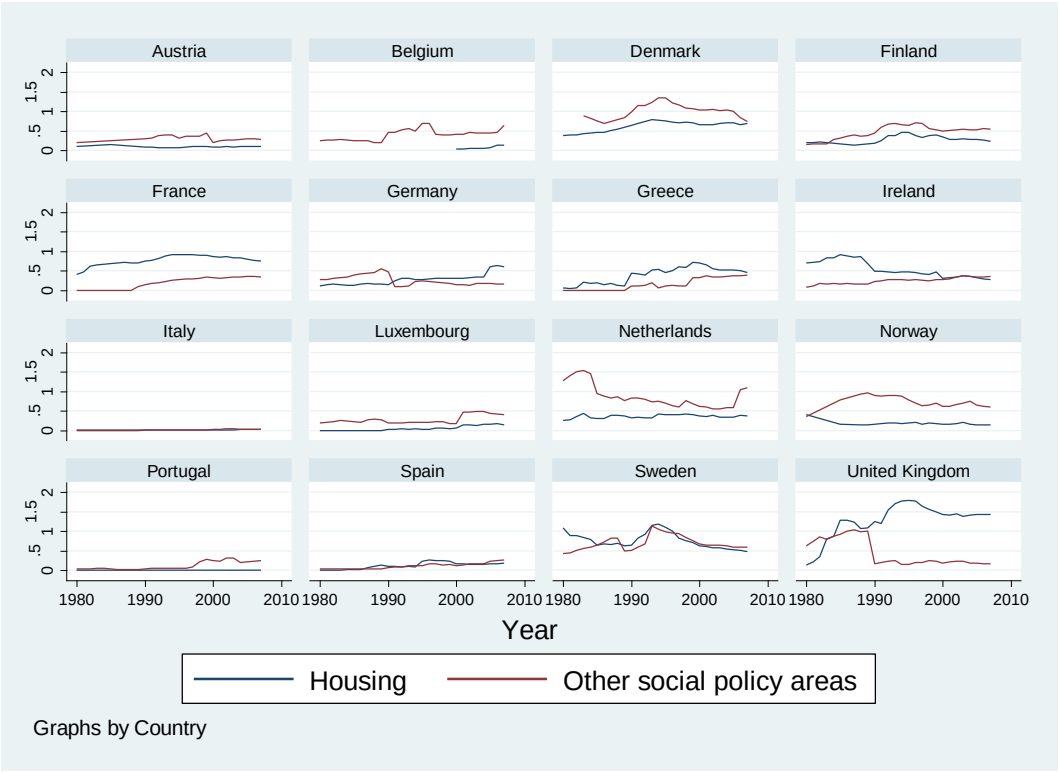


Figure AII- 14: Social protection expenditure incapacity related (points of GDP)

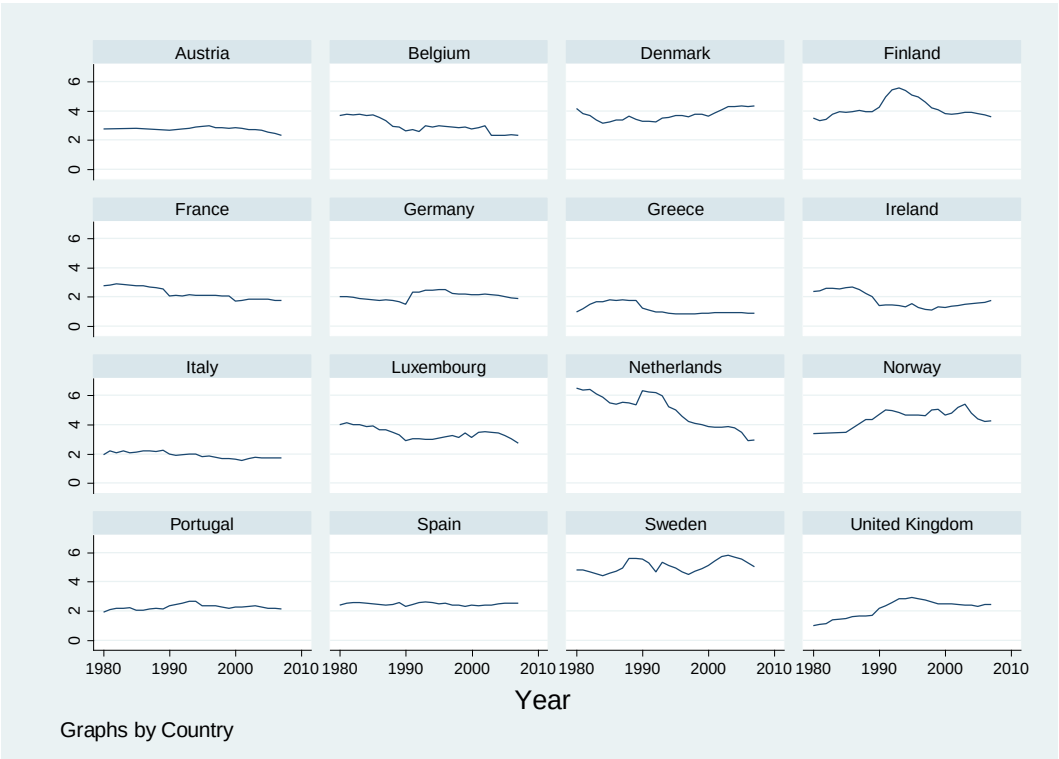


Figure AII- 15: Active and passive labour market programmes (points of GDP)

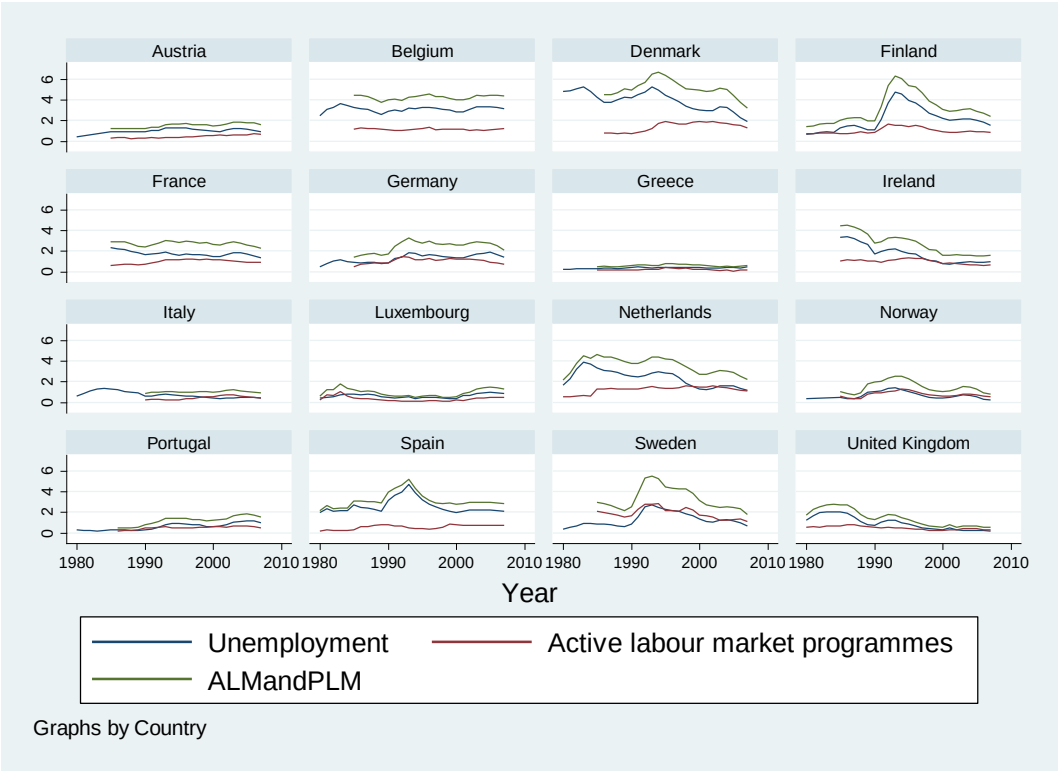


Figure AII- 16: Main social protection expenditure by branch (points of GDP)